# Satellite Data Show that there Was No Global Warming Before 1997

Subsequent warming was discontinuous and was not caused by carbon dioxide

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**Warning: This paper has been rejected by Science and Nature. It May be hazardous to your research grant.**

# Executive Summary

1. Satellite records show that global temperature does not vary randomly but oscillates with a peak-to-peak amplitude of 0.4 to 0.5 degrees Celsius and a period of three to five years about a mean value that remains constant. Examination of land-based data indicates that such temperature oscillations have been active, with some irregularities, as long as records have been kept.

2. The mean temperature about which these oscillations swing remained the same during the eighties and nineties, showing absence of global warming for this period. But simultaneous land-based measurements (HadCRUT3) show a warming of 0.2 degrees Celsius for that same period. Both cannot be correct.

3. Cause of these global temperature oscillations is a periodic movement of ocean waters from shore to shore, associated with the El Nino – Southern Oscillation or ENSO system. This is accompanied by massive back and forth transfers of heat between the oceans and the atmosphere which was previously unsuspected and which shows up in all world temperature records. The absence of this major atmospheric phenomenon from IPCC global circulation models (GCMs) invalidates such models. Hence, any climate assessment based on these models is based on nothing more than GIGO.

4. Normal ENSO temperature oscillations were suddenly interrupted from 1997 to 1999 by a giant warming peak, attributed to the "1998 super El Nino."

5. This unusual warming interrupts the oscillatory ENSO system and straddles its La Nina phase. After it has subsided the ENSO oscillations pick up again without missing a beat. Having absorbed energy from that "El Nino that should not be there," however, global temperature now rises to a peak 0.2 degrees above that of previous peaks.

6. But the oscillatory downturn that should follow it fails to occur and a six-year warm period – the "twenty first century high" – begins. Effective world temperature during this warm period is 0.4 degrees above the effective temperature that existed before the 1998 peak. This warming, with the 1998 peak, and not some trace amount of carbon dioxide in the air, are jointly responsible for accelerated loss of arctic ice. The warm period ends with a temperature downturn in 2007. This in turn bottoms out in 2008 and the temperature is now on the rise again.

7. Since the energy of that 1998 warming peak did not come from the ENSO system it is entirely unaccounted for and could well be cosmogenic. Gamma ray burst GRB 971214 is a possible candidate source.

8. All land-based temperature records such as HadCRUT3 that show late twentieth century warming in the eighties and nineties when there was none are inflicted with massive systematic errors. The usual suspect is the urban heat island effect. The fact that land areas have tended to warm faster than ocean areas and winter months more than summer months (IPCC 2007) points in that direction.

9. Finally, a word about Al Gore and the IPCC Nobelists. I am sorry to say that the emperor has no clothes on. A trace amount of carbon dioxide in the air does not cause global warming as required by their religion. There was no warming in the eighties and nineties and the warming that does exist started only in 1997, is entirely different in kind, and is not understood. Time for them to close down that Kyoto shrine of theirs and start doing some real climate science.

## Abstract.

**A full analysis of satellite-measured lower tropospheric temperatures indicates that none of the global temperature variations from 1978 to 2008 can be attributed to the effect of carbon dioxide as a greenhouse gas. The record shows global climate oscillations with a period of three to five years and a peak-to-peak amplitude of 0.4 to 0.5 degrees Celsius about a common, fixed mean temperature that lasted from 1978 to 1997. Since this mean temperature did not change for twenty years the late twentieth century warming touted by IPCC and others simply did not happen. The cause of these newly discovered climate oscillations is large-scale periodic movement of ocean waters from shore to shore, part of the El Nino – Southern Oscillation (ENSO) system. It is accompanied by a massive, periodic transfer of heat from the oceans to the atmosphere and back again which was previously unsuspected and which is detectable even in land-based records. This major atmospheric phenomenon is missing from all IPCC Global Circulation Models (GCMs) and thereby invalidates conclusions drawn from their climate models. Satellite records show that this oscillatory period ended with a giant warming peak known as the "super El Nino of 1998." This unusual peak does not belong to the oscillatory ENSO system but interrupts it and could well be of cosmogenic origin. After it subsided the interrupted ENSO oscillation continued. But it had been energized from that warm peak and in three years the global temperature rose to a plateau 0.2 degrees above previous peaks. The expected climate downturn that should have followed failed to occur and temperature stayed up there for six years. It lasted from 2001 to 2007. This "twenty first century high," together with the warming peak that preceded it, accounts for recent accelerated loss of arctic ice. Contrary to carbon dioxide theory the world temperature did not increase but stayed the same during this period. The period ended with a climate downturn in 2007. Carbon dioxide cannot explain the lack of warming in the eighties and nineties, nor any of the abrupt warmings that followed, nor the stasis of the twenty first century high, nor the temperature downturn that followed it in 2007 and bottomed out in 2008. A direct comparison of these satellite data with ground-based measurements is also possible. Comparing satellite (UAH MSU LT) and land-based (HadCRUT3) data for the eighties and nineties gives HadCRUT3 a warming trend of 0.1 degrees Celsius per decade (one degree per century) while lower tropospheric satellite data show no warming at all. This is compounded by the fact that satellite measurements of mid-tropospheric temperature show a long-term cooling effect for this period. Looking for sources of error in ground-based data one is led to the usual suspect, the urban heat island effect. Fatal computer errors in IPCC climate models derive from the fact that none of the abrupt warmings and coolings on the record, especially since 1998, can be attributed to the greenhouse effect. Hence, all IPCC models purporting to predict (project??) climate a hundred years into the future are invalid and their predictions/projections must be discarded. To summarize: existing theory used by the IPCC can neither explain the observed climate nor predict the future. Carbon dioxide warming has been shown to be non-existent in the eighties and nineties, and the warming since 1998 is not carbonaceous in origin. It follows that Quijotic carbon dioxide policies like the Kyoto Protocol and the cap-and-trade laws should be abandoned.**

## Introduction to Satellite Data

There is no shortage of global temperature graphs on the web, an example of which is shown in Figure 1. It is taken from NOAA's web site and purports to show how world temperature has behaved from 1880 to 2008. The origin of the data is not stated beyond claiming that it combines land and ocean measurements. The values shown are yearly "anomalies" or deviations from the mean of a stated period and show how much below or above that mean the year's temperature strayed. The blue line is a running or multi-year average whose purpose is to get rid of random variations that only confuse the issue. As a result, the giant 1998 "super El Nino" is averaged out of existence and the cooling in 2008 is ignored. The right side of the graph, starting around 1980, shows a dramatic runup of temperature referred to as late twentieth century warming. It continues into the early twenty-first century. The eighties and nineties, in particular are used by the IPCC to justify their claims of global warming. As it happens, this section of the graph also overlaps available satellite data. IPCC believes that this global warming is real, that it is caused by the greenhouse effect of carbon dioxide, and that it will lead to disastrous climate change by the end of the century. And as the concentration of carbon dioxide in the air increases, so does global temperature according to them. Hence, to

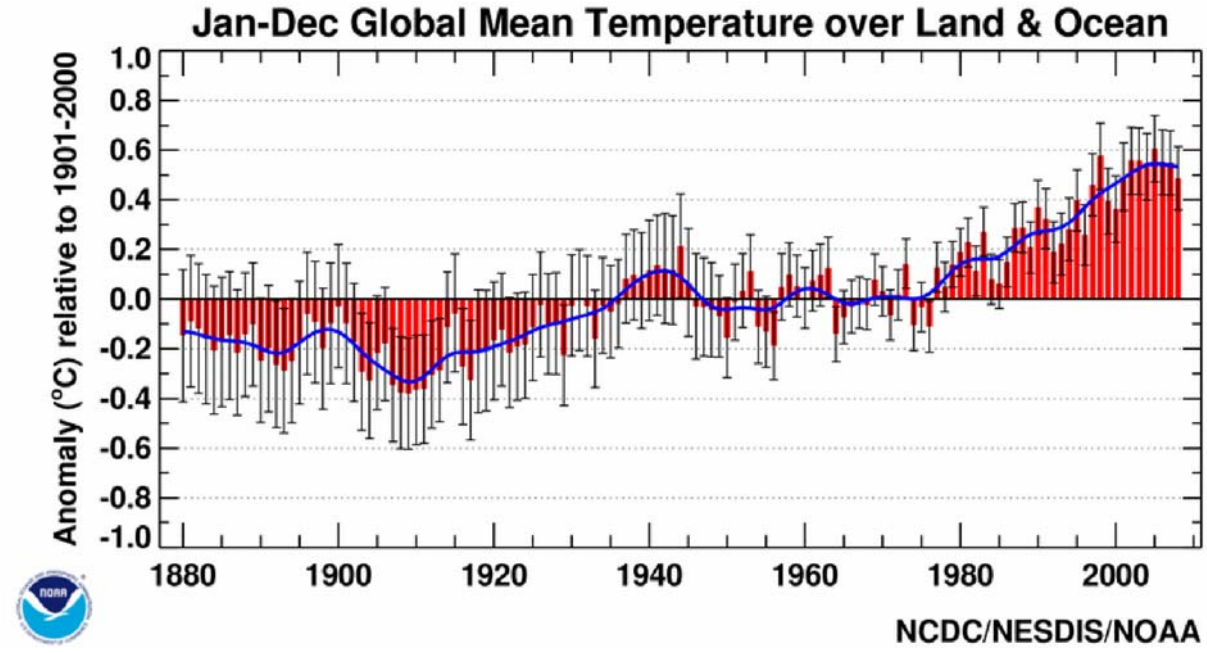


**Figure 1. World temperature history from 1880 to 2008 according to NOAA**

stop that warming, we must reduce the $CO_2$ buildup in the air by such measures as the Kyoto Protocol, carbon trading, and reduced burning of fossil fuels. But is this really true? Carbon dioxide is a trace component of the atmosphere and it did not start increasing in 1980 but much earlier than that. And now we find that satellite measurements, reported to be accurate within plus or minus 0.03 degrees Celsius, (1)(2) contradict ground-based measurements. Yet these facts are strangely discounted by Al Gore and the IPCC Nobelists. The satellite record itself is complicated and since a full analysis of it is still not available I will attempt to fill this gap here. After examining available satellite sources I chose to use two of them, UAH (3) and RSS, (4) for this study because their results are highly consistent with one another and they are as free of spurious data as possible. Using two sources instead of one has the further advantage that random errors in the two data sets are not correlated and tend to cancel one another. It wasn't always so rosy, however, for RSS was originally started up to keep UAH "honest" when their original data gave temperatures lower than expected by experts. But that problem was soon resolved when it was realized that UAH had failed to account for the effect of the decay of satellite orbits on their measurements. Both data sets are now highly concordant and cover the period from 1978 to the present with a precision and accuracy not possible with ground-based observations. The data are derived from measurements of Oxygen microwave emission line intensities from the lower troposphere which are thermally excited and hence are a proxy for the atmospheric temperature at that level. This lower troposphere is our home – the air we breathe, the weather we experience, the pollution we hate. It is warmed both by convection from the ground up, which is in turn warmed by the sun, and *in situ* by the primary greenhouse effect as the greenhouse gases absorb ground radiation and are warmed thereby. Mid-troposphere data show features similar to lower troposphere, indicating that considerable mixing occurs. This mixing is also how the primary greenhouse warming of the troposphere is transmitted to the ground (or the ocean, as the case may be). On a common graph (5) the lower troposphere data from UAH and RSS fall very close to or on top of one another as shown in Figure 2.

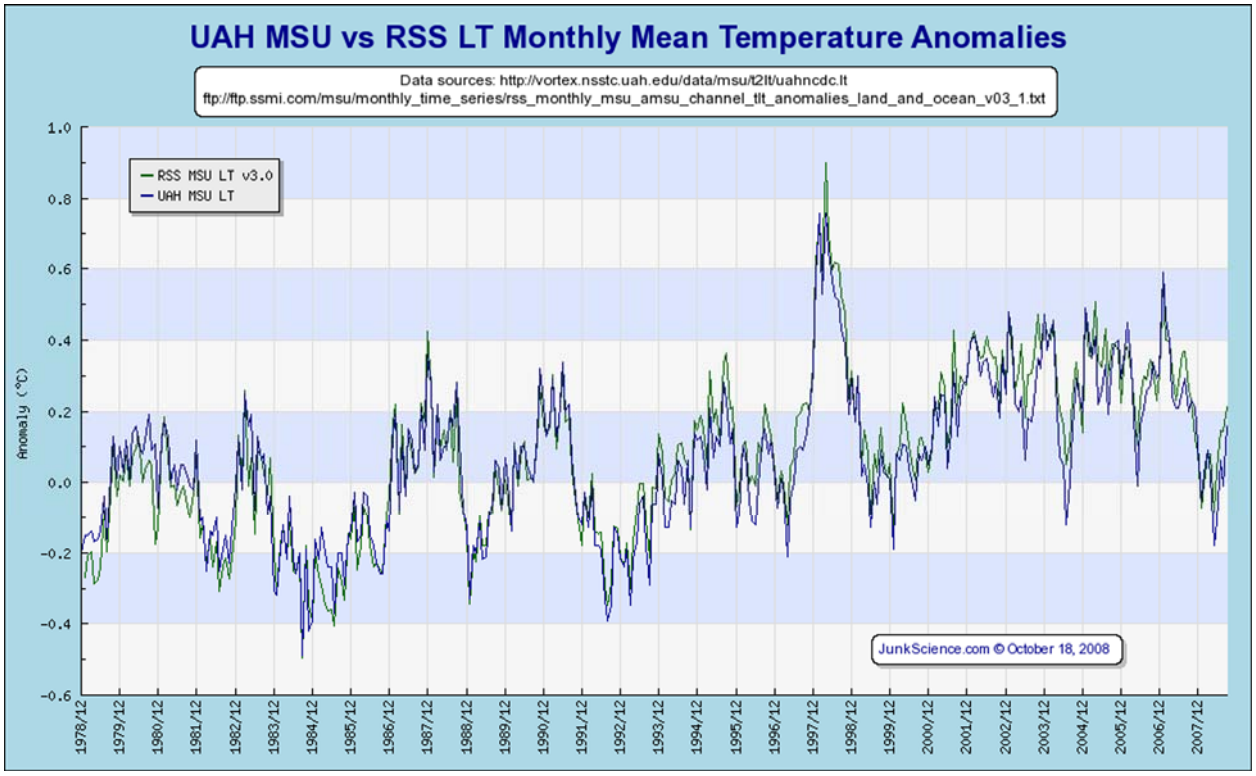


**Figure 2. Lower tropospheric mean monthly temperature anomalies from UAH MSU and RSS MSU satellite observations from 1978 to 2008, plotted on a common graph.**

The graph is jagged, with many peaks small and large, and the question is what to make of all this mess. The first thing that comes to mind is to draw the best straight line through that pesky noise, as in Figure 3.

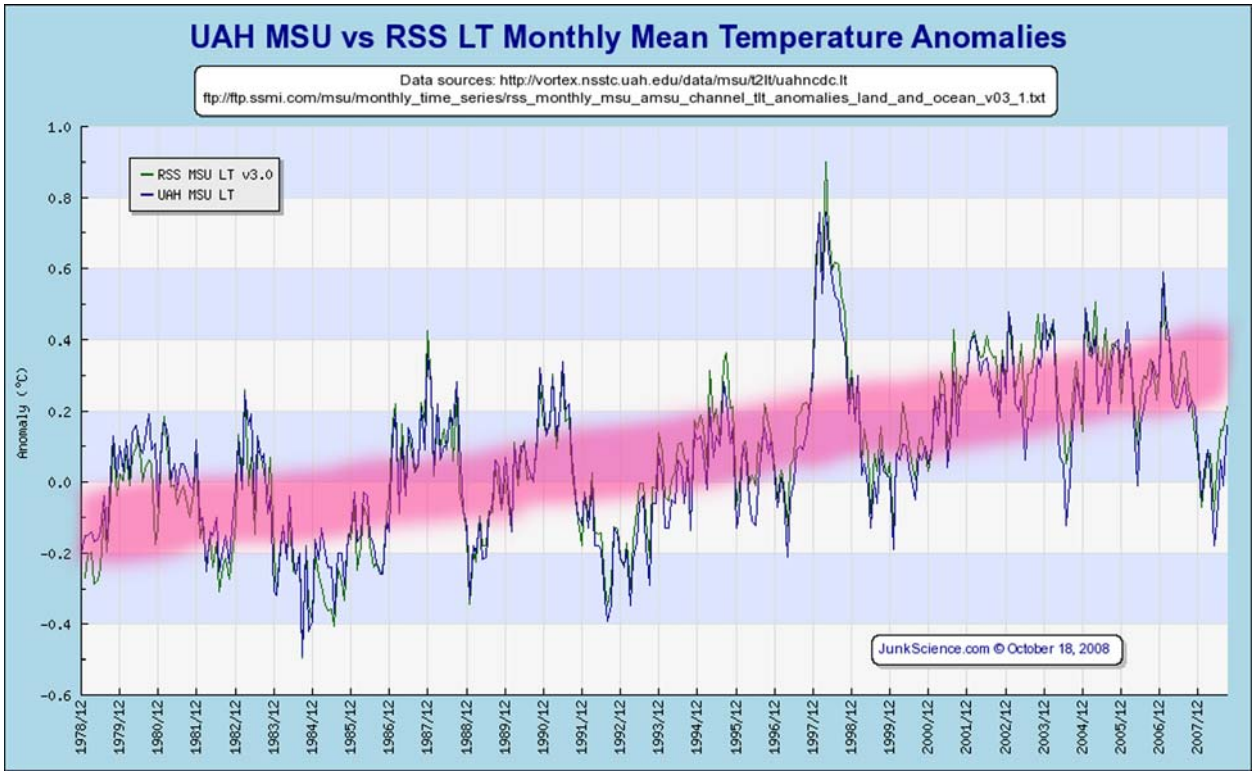


**Figure 3. Same data with a possible linear trend drawn in.**

Doing this results in a trend line with an upward slope, exactly what global warming is supposed to be all about. But should you let it go at that you would be wrong because you would be ignoring information and throwing out data just because you expect a trend. To get at that information we have more work to do.

## Previous Analyses of Satellite Data

One way to make better sense of this record is to simply average out small variations by looking at annual means. This has been done and published records showing the annual mean temperature curve exist. Figure 4 shows such annual means (I hand traced it from a slide by Fred Goldberg), superposed on the satellite data. But instead of simplifying the graph it becomes more complicated and harder to understand.

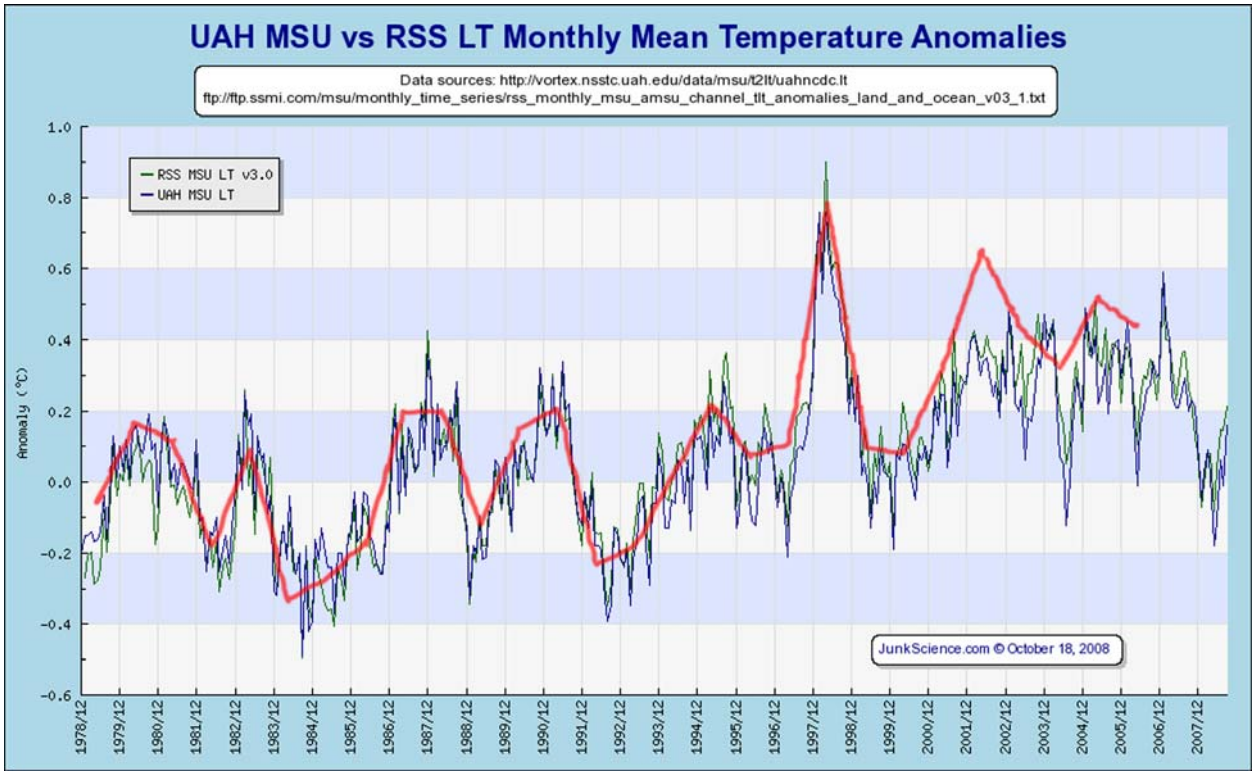


**Figure 4. Yearly averages (red),** adapted from Fred Goldberg and s**uperposed on satellite data**.

Now prominent ups and downs of temperature appear, apparently real but something that carbon dioxide never predicted, and climatologists have had a field day trying to explain them. Figure 5 shows proposed common identifications that I am aware of. I count five El Ninos, four La Ninas, three volcanoes and the "Super El Nino" of 1998 in this graph. This gives us a total of thirteen separate *ad hoc* causes that explain almost all

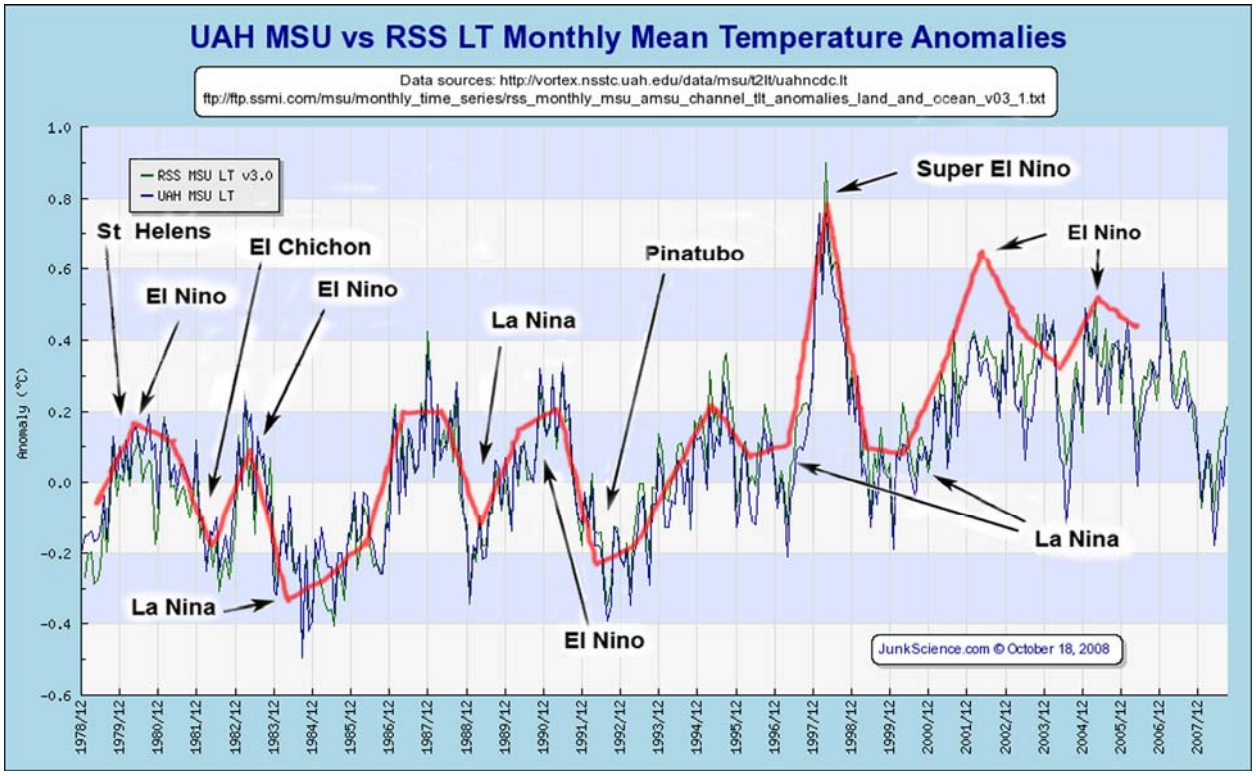


**Figure 5. Common identifications made of causes for temperature fluctuations, after Fred Goldberg.**

the vagaries of our climate, and they all know just how to cooperate to make us think the globe is warming. But all is not yet well with this picture: the small oscillations eliminated by averaging have a life of their own. Even the smallest peaks in the record that look like noise are not noise because they show up in both data sets, and somehow we must account for them all.

## Making Sense of Observations

Fortunately we humans are good at pattern recognition and when attention is drawn to this conundrum we see immediately that we are dealing with a superposition of two separate, independently oscillating systems. All this is easy to grasp when the larger oscillations are outlined by a light red band whose width corresponds to the

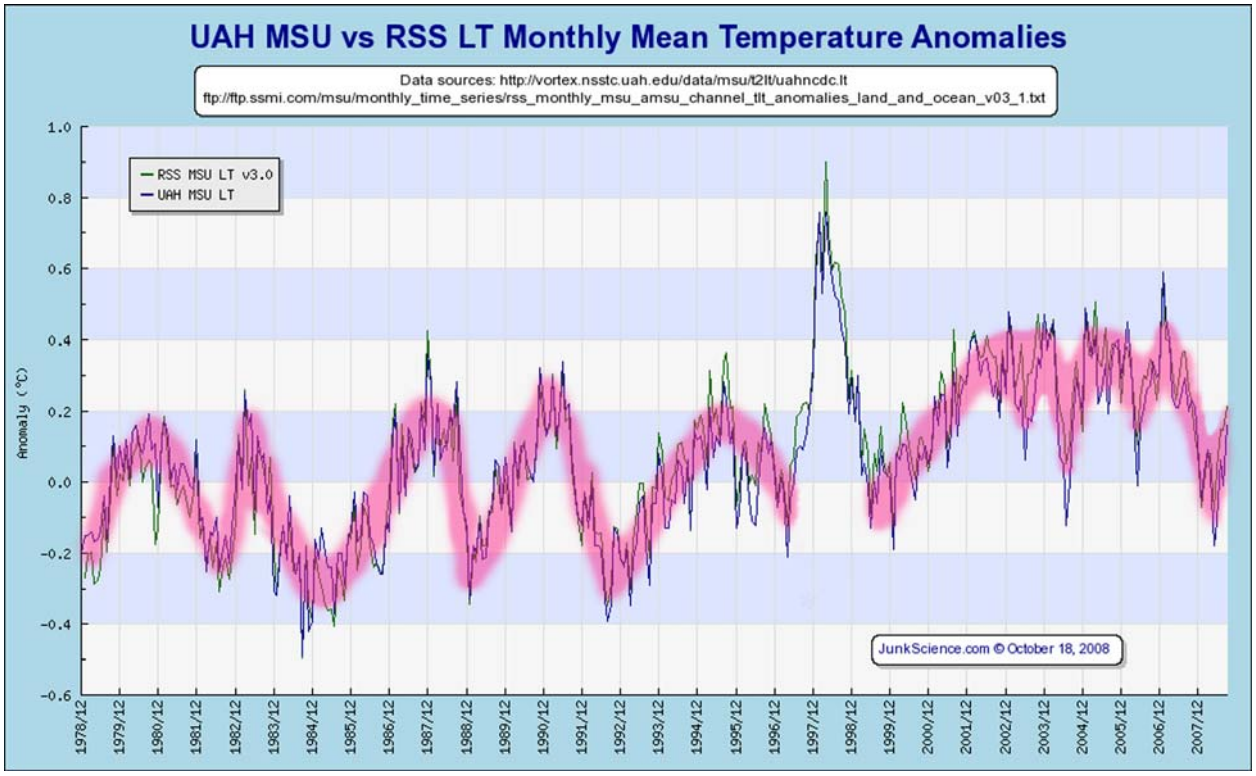


**Figure 6. Major climate oscillations. The exceptional peak from 1997 to 1999 does not belong to this set. Width of the light red band corresponds to the scale of the cloudiness variable.**

small oscillations, as in Figure 6. More than likely the small oscillations are a reflection of fluctuating cloud cover that can modulate the ground area being warmed by the sun and thereby influence the temperature. With some variation, they seem to have an approximately monthly or bimonthly scale. And the larger, “named” variations that so attracted the attention of climatologists are more than just a random collection of ups and downs: they are a coordinated set of climate oscillations. This is absolutely not the

monotonic increase of temperature with time that carbon dioxide warming requires. And with this big picture in mind we see that volcanoes like Mt. Pinatubo or El Chichon, thought to have been sources of cooling, have played no role in influencing these climate oscillations. From 1978 to 1997 the oscillations have a spacing between three and five years and a peak-to-peak amplitude of 0.4 to 0.5 degrees Celsius. Since the cycles repeat we must regard the center line of these oscillations as the effective world temperature, not a running mean as is commonly done. Taking a running mean actually destroys important information about world temperature. But the oscillatory sequence of the eighties and nineties is itself interrupted by a sharp warming peak from 1997 to 1999, attributed to the "super El Nino" of 1998. This peak is distinctly different from all others that precede and follow it. And it sharply divides the climate record into two distinct periods that have characteristics of their own and which must be separately analyzed. Thus, world temperature to the right of the peak is dominated by a unique elevated temperature plateau – the "twenty first century high" – that starts and ends like the other oscillations do but is much higher in between. All of these features must have a physical reason of course. For example, ocean water sloshing back and forth from one side of the ocean to the other is a possible candidate that could produce multi-year repeats like those in the eighties and nineties. And it turns out that something like this is already known: it is the El Nino – Southern Oscillation or ENSO system. The fact that these oscillations show up as global temperature changes indicates a massive, periodic transfer of heat from the oceans to the atmosphere and back again which was previously unsuspected. It is enough to swamp the greenhouse warming of the troposphere predicted by IPCC models that no one has been able to find. Obviously the General Circulation Models (GCMs) used in IPCC computer models cannot produce meaningful results if they exclude this major ocean- atmosphere heat exchange.

## ENSO and Global Temperature

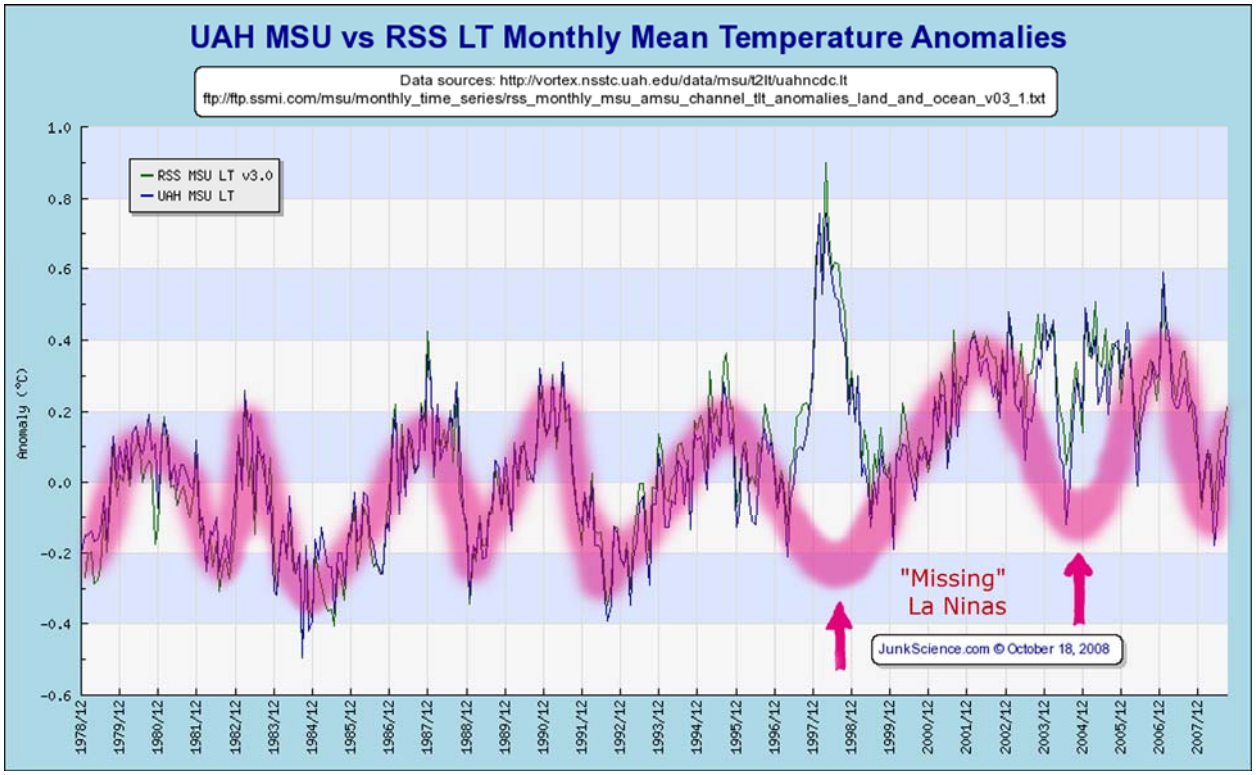


**Figure 7. La Ninas that were over-ridden by the 1998 peak and the twenty-first century high can be reconstructed and fit in perfectly with the ENSO oscillatory system.**

When we relate these climate oscillations to ENSO a lot of other things fall into place as well. The observed temperature peaks, for example, correspond to El Nino phases and the valleys to La Nina phases. But the 1998 “super El Nino” clearly does not fit into this scheme. It and the twenty-first century high wipe out two of the La Nina phases of ENSO as shown by the reconstruction in Figure 7. The normal oscillatory pattern just stops with that super El Nino but picks up again after it has cooled. That is because ENSO itself is a movement of ocean waters and you can’t stop that by a simple temperature change. When the super El Nino itself cools down its heat is transferred to ocean water and very likely lingers there until the next La Nina comes around. This, more than likely, is the heat source of the “twenty first century high” that occurs where a La Nina should have appeared. Even the abortive downturns within this high fit in with the postulated La Nina phase that is missing.

## The "El Nino That Should Not Be There"

But since the "Super El Nino" of 1998 is not even part of a normal ENSO oscillation its energy source becomes a total mystery. While this is speculative, it is possible that its origin is cosmogenic. My favorite cause is gamma ray burst GRB 971214, discovered by the BeppoSAX satellite on December 14th 1997 at a distance of 12 billion light years from us.

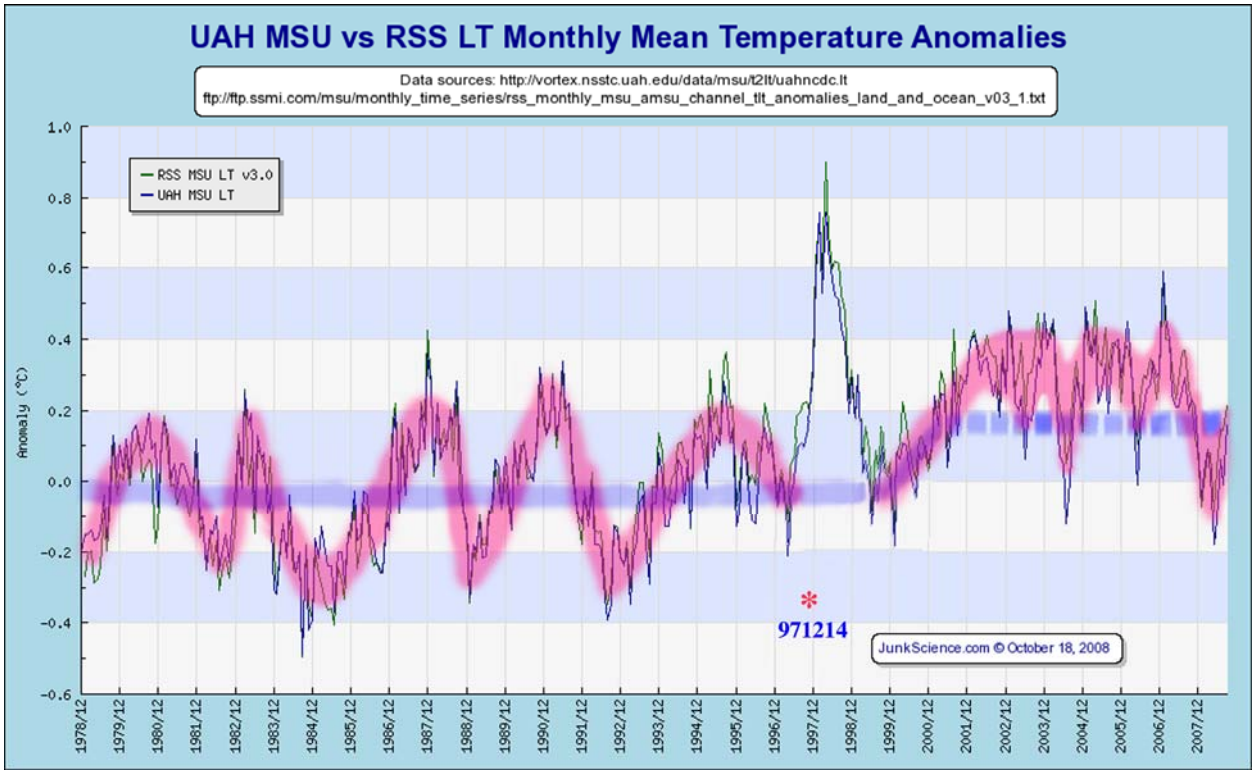


**Figure 8. Same as Figure 6 but showing in addition the center line of climate oscillations on the left and the expected new center line for future climate oscillations on the right. The asterisk designates the date of gamma ray burst GRB 971214.**

It is shown by an asterisk in Figure 8. Such gamma ray bursts are the birth pangs of black holes that lurk in the centers of all galaxies. Although BeppoSAX had already discovered five gamma ray bursts that year, this one was thought to be the greatest explosion since the Big Bang (6) at the time. Although later that was scaled down when it was realized that these bursts are collimated into very narrow beams its apparent brightness was still impressive, and we did get beamed by it. The visibility and the effects of such bursts

depend on exactly what part of the beam hits us. But gamma rays are just a miniscule part of their energy: the bulk of it comes off as neutrinos and as gravitational waves which we cannot detect at all. They would reach us before the gamma rays did but what effect, if any, they might have on us is simply unknown. But let us assume for argument's sake that the observed peak does reflect a sudden, massive injection of energy into the climate system to create an "El Nino that shouldn't be there." By the middle of 1999 it is apparent that this extra energy has already left the troposphere and should have been absorbed into ocean water. If so, the next temperature peak might well rise higher than any of the previous ones did. And this is exactly what we see: the next climate upswing does go much higher than any previous oscillations did and in three years reaches a peak approximately 0.2 degrees Celsius above them. But then the expected downturn that should follow fails to appear and the world stays warm for the next six years. There were a few abortive downturns during this period but absence of a full downturn means that the effective world temperature during this unusual "twenty first century high" is not just 0.2 degrees but 0.4 degrees above the effective temperature that existed before the 1998 peak. As a result, we get a cluster of very warm years during this period. But a real oscillatory downturn does begin in 2007 and then bottoms out in 2008. World temperature should thereafter reach a maximum again in another year or so, assuming that its oscillatory behavior has been restored.

## The Cooling Mid-Troposphere

But a trace amount of carbon dioxide in the air cannot explain either the absence of warming in the eighties and nineties nor the warming events since 1998. Even more damaging are mid-tropospheric data. While lower troposphere shows no global warming in the eighties and nineties, mid-troposphere records show an actual global cooling for this period. Figure 9 shows this clearly. The plot itself looks pretty much like

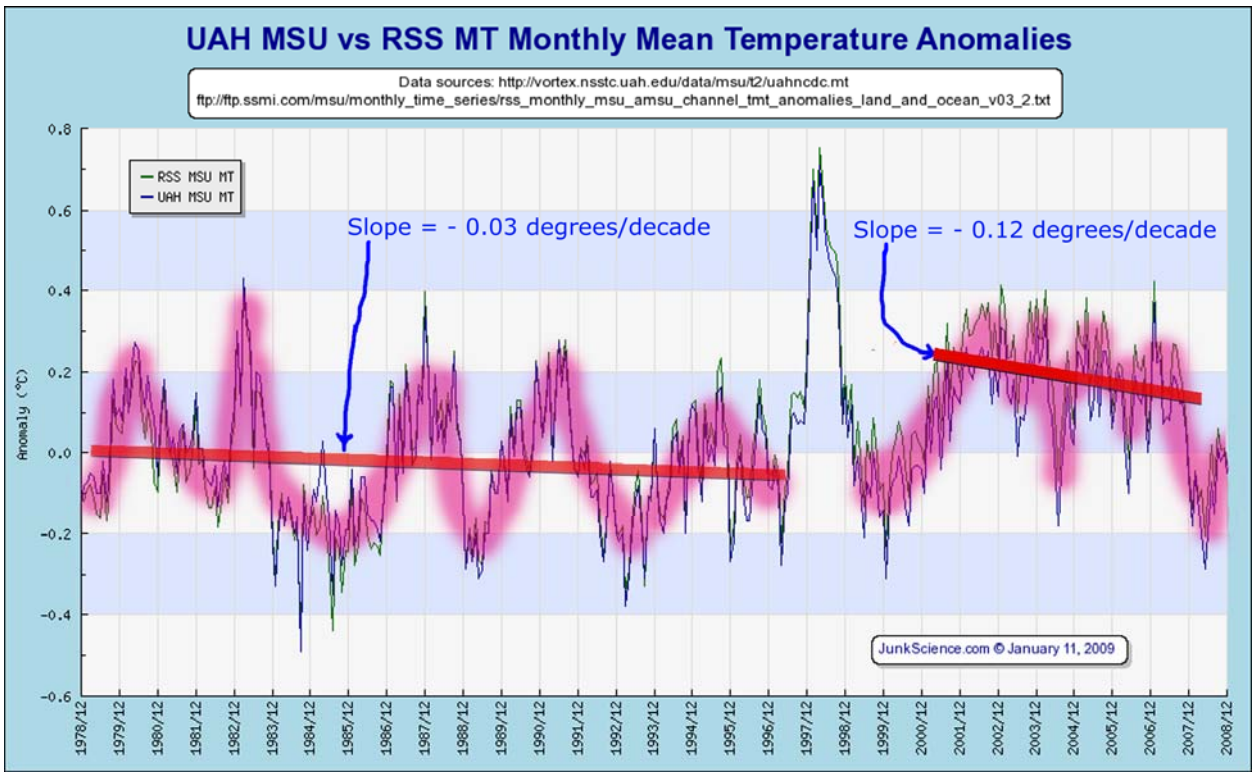


**Figure 9. Mid-tropospheric temperature anomalies 1978-2008. Value of slope is cooling rate.**

the lower troposphere graph did but on closer inspection that twenty first century high is not a plateau any more but slopes down, with a cooling trend of 0.12 degrees per decade. Such rapid cooling might dissipate the extra heat left over from the 1998 peak into space. Eventually this trend should show itself in lower troposphere records as well. But this still does not explain why the oscillations before 1998 also show a cooling trend, in this case 0.03 degrees per decade. We know of course that the earth is losing heat into space but why this heat loss is on the increase now is unclear. A twenty or thirty year satellite record is not long enough to make sensible hypotheses about it. For the longer term we need to look at theories involving solar and/or cosmic ray influences like Svensmark (11) and like Soon and Baliunas (12) have done.

## What We Have Learnt So Far

Let us now take stock. First, there was no increase in world temperature from 1978 to 1997, hence ***no*** observable greenhouse effect from carbon dioxide or any other gas. The ENSO climate oscillations are a hitherto unrecognized permanent feature of our climate that have periodically recurring multi-year effects. The massive heat exchange between the oceans and the troposphere that their existence reveals wipes out any traces of tropospheric warming predicted by the IPCC climate models. The effect of these oscillations has not been incorporated into the GCMs used by IPCC climate models whose validity is thereby put into question. The exceptional, cosmogenic warming peak from 1997 to 1999 and the three-year runup of temperature from 1999 to 2001 are incomprehensible to greenhouse warming theory. The twenty first century high likewise does not fit carbon dioxide theory which predicts a steady increase of temperature, not the stasis that exists. And much less can the current downturn which started in 2007 and bottomed out in 2008 be explained by any greenhouse effect.

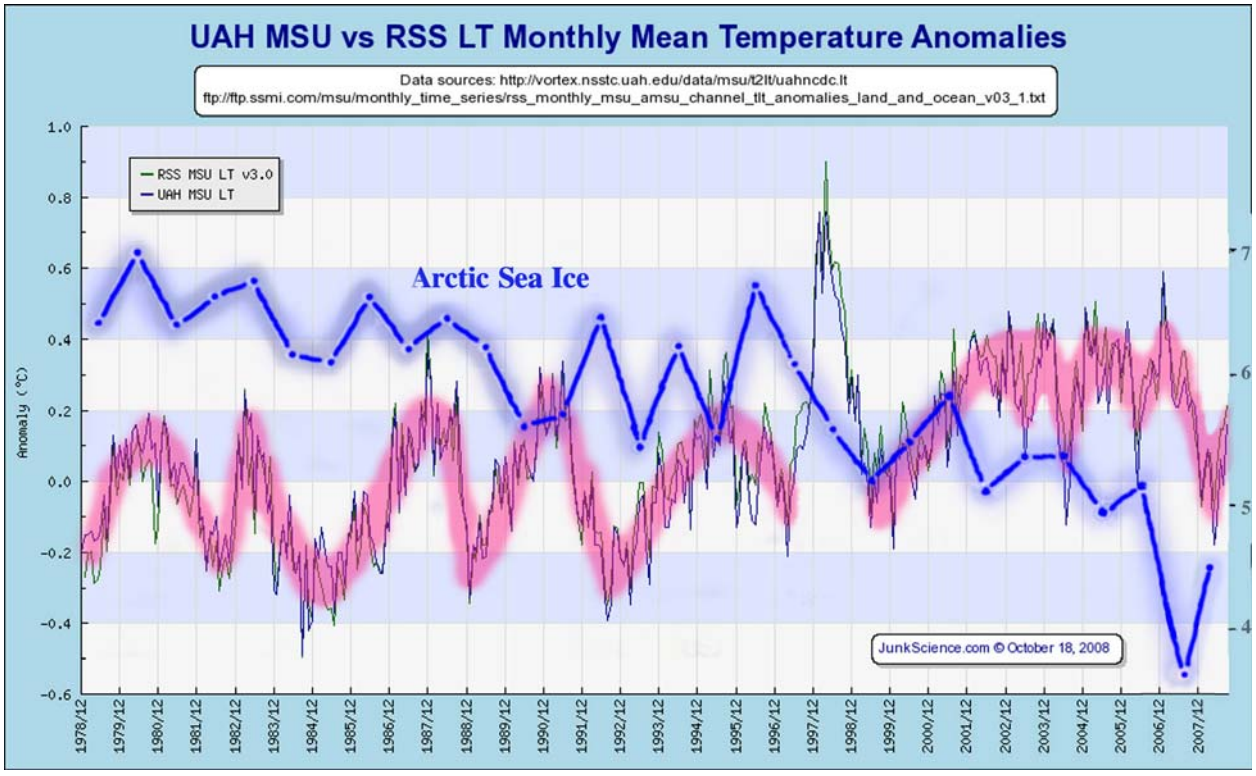


**Figure 10. Satellite temperature record and arctic ice volume from 1978 to 2008. Note normal climate oscillations on the left, twenty first century high on the right, and a cosmogenic peak in between. Scale on the right is in millions of square kilometers.**

Nor does carbon dioxide warming cause accelerated melting of arctic ice: the 1998 “El Nino that should not be there” and the twenty first century high jointly take this honor. As Figure 10 shows arctic sea ice had been slowly melting over a period of years but precipitous ice loss occurred first during the cosmogenic peak and then again during the twenty first century high. The low point for ice was in 2007 but in 2008 it experienced a partial recovery thanks to the lowering of temperature by the climate downturn.

## Comparison with Ground-based Data

But satellite observations cover only the last thirty years and claims are made that carbon dioxide has been active for much more than that. Hence, we should take a longer look at what the climate scientists have been saying about climate history. And since we have identified a discontinuous warming event it would be interesting to go through the record to see if anything like that may have happened before. One such historical record is available from the Hadley Center in the UK (7) and goes by the name of HadCRUT3 (8). It covers the period from 1850 to the present and comes in two flavors: monthly and yearly. The yearly graph is actually a little better - more like

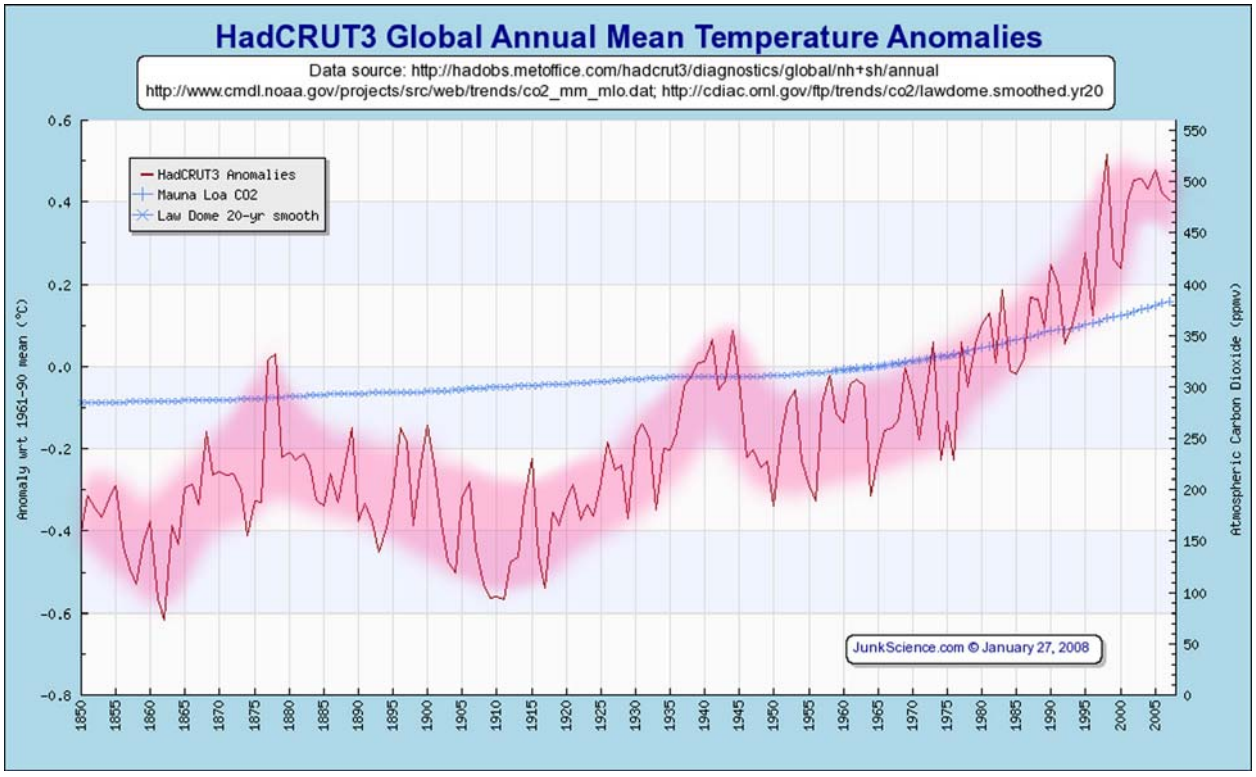


**Figure 11. Hadley/University of East Anglia Climate Research Center global annual mean temperature anomalies, from 1850 to 2008. Note presence of climate oscillations interrupted by occasional irregularities. Upward slope in the eighties and nineties is spurious. Heat wave during World War II is misplaced, perhaps by ten years.**

bimonthly. When the yearly averages (Figure 11) are plotted, the pattern of climate oscillations that was identified in our satellite observations becomes visible and is seen to continue, with some irregularities, to the beginning of observations in 1850. There is

an obvious upward slope to the curve on the right which indicates recent warming. It featured as the "tip" of that infamous hockey stick by Mann et al. Just how much warming is involved there can be measured by using monthly temperature records which overlap satellite observations. Figure 12 shows these monthly temperature anomalies, both from UAH MSU satellite data and from HadCRUT3, plotted on a

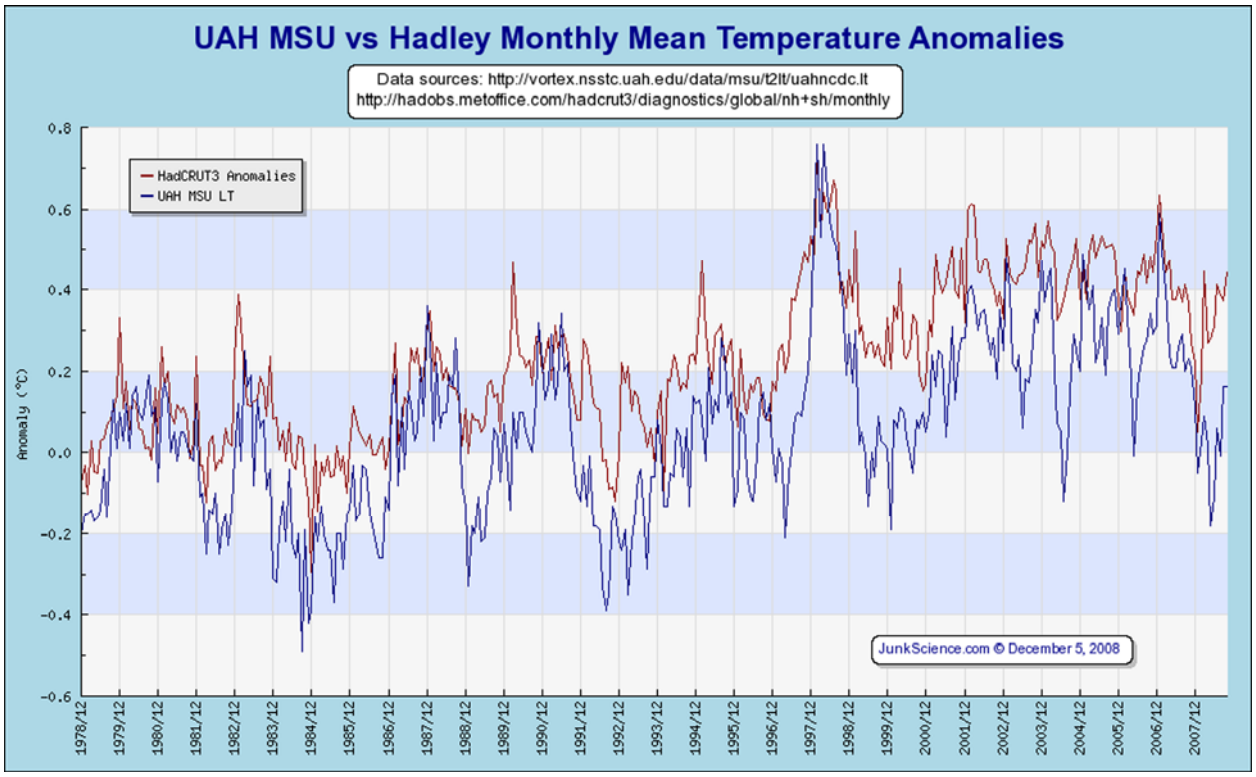


**Figure 12. Raw data on satellite (UAH MSU) and land-based (HadCRUT3) temperature anomalies from 1978 to 2008, plotted on a common graph for comparison.**

common graph. It looks uninformative but features we are only familiar with from satellite records are clearly seen to be present in both data sets, even if somewhat distorted. But to make these data useful we need to outline the climate oscillations as we did before and see what they reveal. This has been done in Figure 13, using red for satellite data and blue for land-based data.

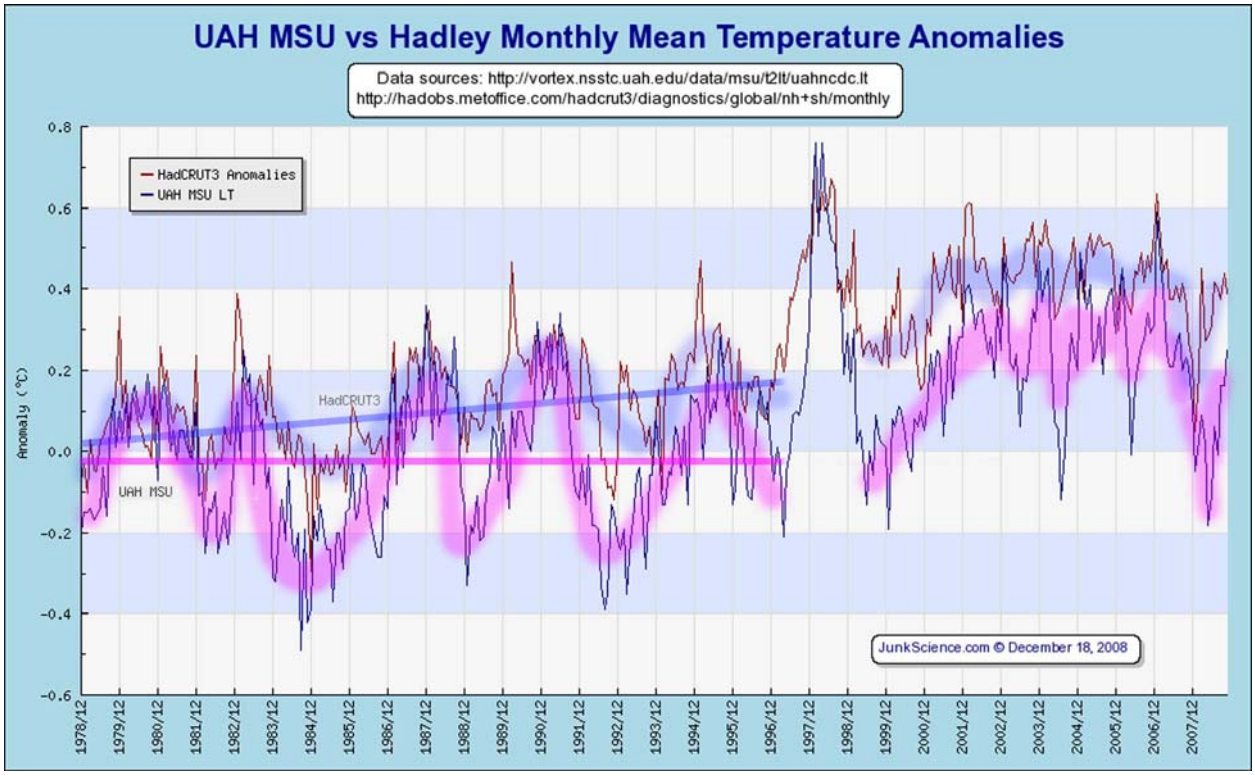


**Figure 13. Analysis of satellite (UAH MSU LT) and land-based (HadCRUT3) temperature anomalies, using Figure 12 as background. The major oscillations have been brought out in color, red for satellite data and blue for ground-based data. Center line of land-based oscillations slopes up while that of satellite data is horizontal. The two data sets start out together on the left and then diverge because of spurious warming built into HadCRUT3 data.**

The center lines of the oscillations are shown for the eighties and the nineties. For satellite data the center line is horizontal as expected while the center line for land-based oscillations has a distinct upward slope. This slope is very close to 0.1 degrees Celsius per decade, giving us a predicted warming rate of approximately one degree per century. But the warming rate from satellite data is still zero and both cannot be correct. The only explanation is that HadCRUT3 and similar land-based data are inflicted with serious systematic errors. The fact that recently land areas have tended to warm more than ocean areas and winter months more than summer months (IPCC 2007)(10) points to the urban heat island effect as the culprit. Assuming that the satellite temperatures are correct, which in all likelihood they are, wipes out the vaunted “late twentieth century warming.” And out with it goes Mann’s infamous “hockey stick.”

## Conclusions

Eighties and nineties for which satellite data show no warming are also the years whose global temperature absolutely must show warming in order to legitimize recent IPCC climate assessments. It is of course very unfortunate for them that since there was no such warming the tip of their hockey stick is now missing - and they can't even play hockey any more! And since the warming they claim was entirely imaginary their computers went GIGO and produced output that was worthless. Not to mention their total inability to understand what happened after 1998. It follows that there is no justification either for the Kyoto Protocol or for such things as carbon trading or carbon tax that are built on such defective science. Nevertheless, these policies are a part of the Nobelists' faith and are vigorously pushed by greens and their political allies. In addition to this false warming, there are other problems with their land-based temperature graphs. HadCRUT3 misses the warming in the thirties and severe cooling that followed it during World War II. The latter is actually shown as a heat wave that looks suspiciously like a discontinuous warming event I was looking for. If it had peaked ten years earlier where it really belongs and not in the forties I might even have thought it was one, but the problem is this: during that "heat wave" the Finnish Winter War was fought in the bitter cold of minus forty Celsius, arctic winters decimated the German invaders in Russia, and GIs fought their way from the Battle of the Bulge to the German frontier in the coldest winter that West Europeans could remember. And now NASA has admitted that 1934 which brought us the dust bowl, and <u>not</u> 1998 was the warmest year of the twentieth century - all thanks to Steve McIntyre of Toronto (9) who unearthed errors in their data! But this, according to NASA, applies only to the United States and not to the world. Is it possible that we don't live in that world? Such temperature records are the basic data for climate research and if we cannot trust them we are in big trouble. Not only HadCRUT3 but also GISTEMP from NASA both show warming in the eighties and nineties that does not exist. And yet those data are treated as facts by the IPCC. We have good reason to believe that the so-called "hockey stick" temperature curve by Mann et. al (13) did not describe the true temperature history of the world (12)(14). In view of this, how can we be sure of the integrity of other data they use? At the very least a severe systematic error, most likely the urban heat island effect, is present in their land-based records. It must be rooted out before any serious science can be done. Let's get back to the drawing boards and fix it, fellows!

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