

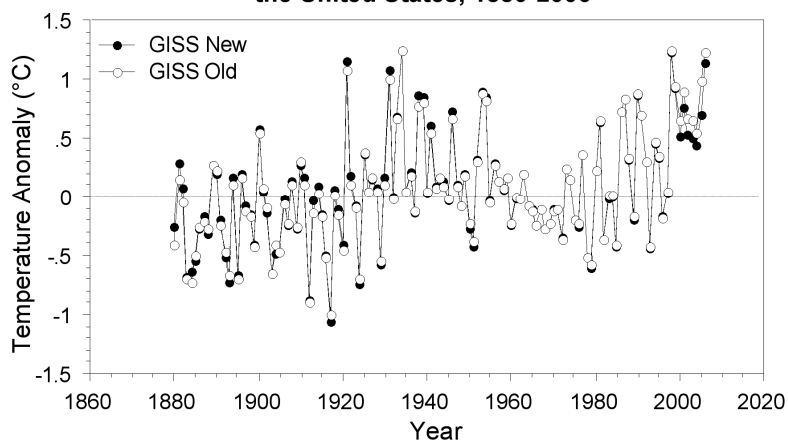
U.S. TEMPERATURE RANKINGS REARRANGED

Problems and Concerns with Temperature data sets

by

Robert Ferguson

**Comparison of the Old and New GISS Temperatures for
the United States, 1880-2006**



Science & Public Policy Institute

"science based policy for a better world."

www.scienceandpublicpolicy.org

Table of Contents

Breaking Developments	3
Key Lesson	6
Policymakers and voters, take note	7
Conclusions	7
Appendix I - Popular blog post on USHCN temperature data concerns	9
Appendix II - Blog post #1 on Hansen's GISS temperature series	14
Appendix III - Blog post #2 on Hansen's GISS temperature series	16
Appendix IV - Blog post #3 on Hansen's GISS temperature series	21
Appendix V - Keenan Allegation about the Jones temperature data sets	31

U.S. TEMPERATURE RANKINGS REARRANGED

Breaking developments

Trumpets were blaring at the *Washington Post* when, on the front page of the January 10th, 2007 edition of the paper, they proclaimed “Climate Experts Worry as 2006 is Hottest year on record in U.S.” The *Post* was relying on temperature data supplied to them from the National Climatic Data Center (NCDC).

In a subsequent reanalysis of their U.S. temperature dataset, NCDC determined that, in actuality, 2006 was only the second warmest year on record in the U.S., falling 0.08°F short of the mark set in 1998, and a mere 0.02°F above the value for 1934. Did the *Post* fire up its headline maker again? “2006 no longer the hottest year ever!” Not a chance. Buried down in a July 25th, 2007 AP story that the *Post* carried on-line and titled “Study: Nevada Has Big Temperature Gains,” was the following: “According to the National Climatic Data Center, the 2006 summer and 2006 overall were the second warmest on record for the lower 48 states.”

So much for the January fanfare. Apparently only alarmist events are newsworthy; ignored if later proven wrong.

A similar reanalysis has just taken place within a different compilation of historical U.S. temperatures—this time it is with the dataset of U.S. temperature maintained by NASA’s Goddard Institute for Space Studies. This is the dataset that Jim Hansen and colleagues produce, and is a favorite of fellow climate fundamentalists like Al Gore and Naomi Oreskes.

Until earlier this week, GISS ranked 1998 as the warmest year on record (since 1880) for the United States in a tie with 1934. Last year came in as the third warmest on record, a hundredth of a degree behind 1998 and 1934. Further, five of the top ten all-time warmest years were during the last 10 (1998, 2006, 2005, 1999, 2001).

But last week, a problem popped up. Researchers Steve McIntyre (<http://www.climateaudit.org/?p=1880#more-1880>) and Anthony Watts (http://www.norcalblogs.com/watts/2007/08/1998_no_longer_the_hottest_yea.html) noticed that there seemed to be an unusual discontinuity—a step upwards—in the temperature records from many of the individual stations that went into the GISS U.S. national aggregate.

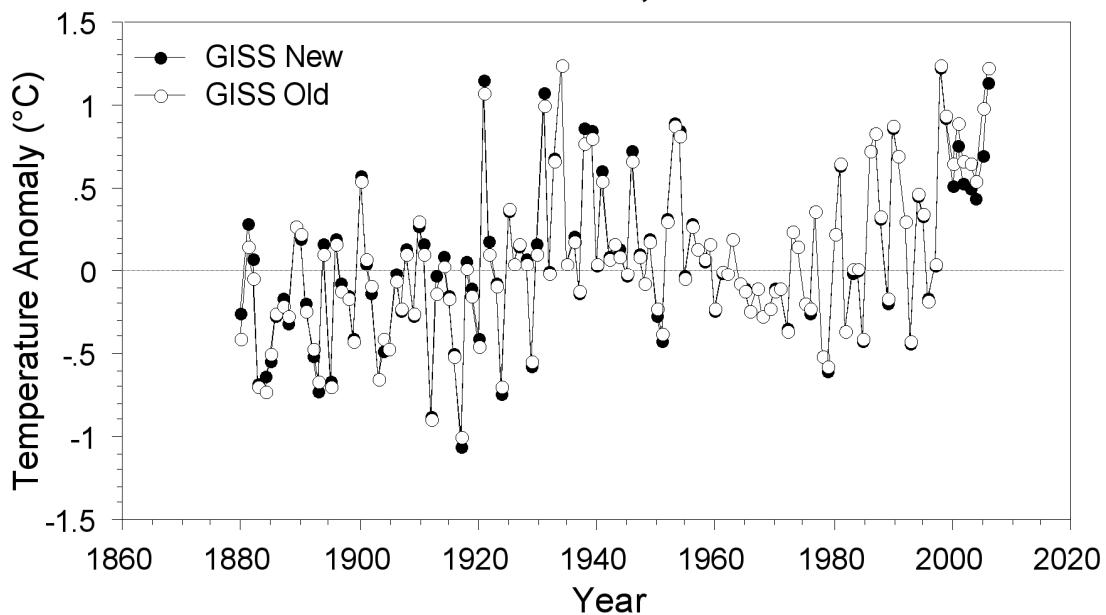
Upon carefully documenting this apparent discontinuity and inquiring to the record keepers at GISS about it, it was determined that GISS had accidentally incorporated a data error in their routines aimed at updating and compiling individual station histories as well as the U.S. national temperatures.

After adjusting their procedure to account for this problem, NASA GISS has now made available a new and improved temperature history of the United States. In this more accurate record, the year 2006 now drops to the 4th warmest year of all-time, a full 0.12°C behind the new sole record-holder, 1934. In the new dataset, only three of the past 10 years are included among the top-10 warmest years of all-time in the United States.

Temperature change exhibits a warming-cooling oscillatory character through time.

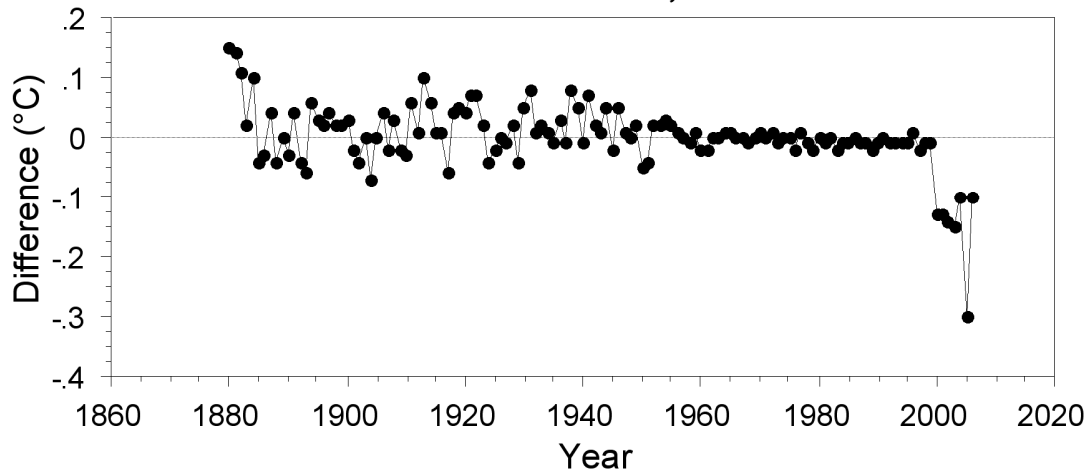
The newly corrected record also makes it apparent that no uniform global warming trend exists such as is predicted by the IPCC's computer models. Rather, the data reinforce a phenomenon known from many other studies, which is that temperature change exhibits a warming-cooling oscillatory character through time, with an apparent periodicity of about 65 years.

Comparison of the Old and New GISS Temperatures for the United States, 1880-2006



The old GISS annual temperature history of the United States (open circles) and the new GISS annual temperature history of the United States (closed circles) for the period 1880-2006. Note that the new data is a bit warmer in early years, and cooler since 1990.

Difference Between the New and Old GISS Temperatures for the United States, 1880-2006



The difference (new minus old) of the two versions of the GISS compilation of U.S. annual average temperatures. Note the obvious problem starting in the year 2000.

And, of course, all this has played out without any fanfare in the media. Had the sign of the error been reversed that the gentle late 20th century warming was increased, most assuredly you would have seen it on the Evening News or headlined in the morning paper.

Joe D'aleo¹ reported it this way²:

New Rankings for Warmest Years

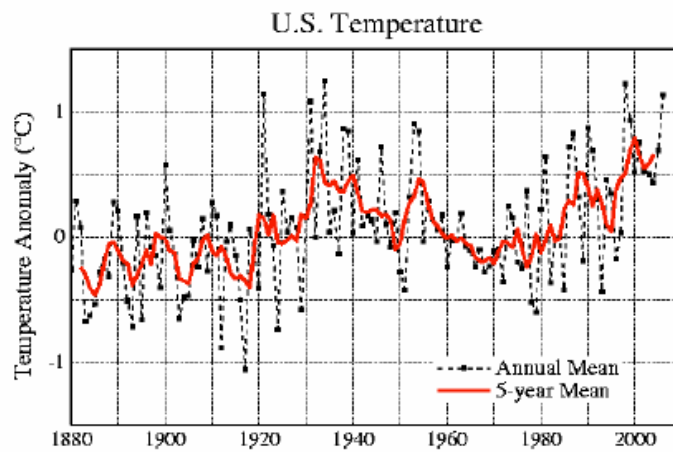
With the changes to the GISS data made today after an error was found by Stephen McIntyre, 1998 falls to #2 behind 1934 as the warmest [USA] year, followed by 1998, 1921, 2006, 1931, 1999 and 1953. Expect more changes to come in the months ahead as more scrutiny of the data bases takes place. Note in the graph [below], the peak in the five year mean around 2000 is a mere 0.25F higher than that in the early 1930s.

10 of the top 20 warmest years occurred since 1980, 10 from the 1920s to 1950s. Only 4 of the top 10 occurred since the 1980s, 6 fell in the prior warm period.

Don't expect any press releases from NASA or NOAA about this change nor much coverage on the networks or major newspapers³.

¹ <http://scienceandpublicpolicy.org/personnel.html>

² <http://icecap.us/>



Top 20 warmest years NASA GISS

1934	+1.25
1998	+1.23
1921	+1.15
2006	+1.13
1931	+1.08
1999	+0.93
1953	+0.9
1990	+0.87
1938	+0.86
1939	+0.85
1954	+0.85
1987	+0.83
2001	+0.76
1986	+0.73
1946	+0.72
1991	+0.69
2005	+0.69
1933	+0.68
1981	+0.64
1941	+0.61

Key Lesson

The key lesson here is not that NASA GISS or Jim Hansen or anyone else was intentionally making mistakes, but that in complex data compilations and analyses, no matter how diligent you try to be, mistakes work their way in. This is why it is important to be as open as possible as a scientist about what you did and how you did it, i.e. to make full disclosure of all your data and methods. This allows others to replicate your work and helps assure that science moves forward on the best possible footing, and that policy-makers operate off of factual data and not belief systems.

³ That is, newspapers who generally take the lead in this silly game of ‘x out of the last y years are the warmest since XXXX’. Of course they are, and for the same reason that most of the warmest days each summer cluster around the June summer solstice – such clusters are an inevitable result of a sinusoidal temperature pattern through time, be that pattern on a scale of 24 hours, 365 days or 65 or 1500 years. League tables of ‘hottest ever’ or ‘coolest ever’ years have absolutely no meaning outside of an identification of the natural cycles of temperature on the time scale being applied. Rather, hottest-day league tables are a media stunt aimed squarely at reinforcing the IPCC climate fundamentalists.

It is for this reason that it is of the gravest concern that leading climate scientists and organizations, up to and including even the IPCC, are still failing to make full disclosure regarding many of the data that they spin into the public domain. Stephen McIntyre's earlier work that exploded the myth of the hockey-stick temperature curve should have been all that was needed for politicians and agencies to enforce full disclosure of all data that is related to public climate policy formulation. Alas, McIntyre's revelations were not adequate to overcome the vested interests and bureaucratic inertia of the responsible persons, and so now he has had to repeat the dose of education with his second discovery regarding the flawed GISS temperature data. How many flaws is this unpaid investigator going to have to discover before someone establishes the needed climate audit agency (perhaps as an organ of the Asia-Pacific climate partnership)?

Policymakers and voters, take note

Surely there are other problems in the variety of temperature data collected and compiled on local, regional, national and international scales. Just in the past few days, there's been news about defects in *all three* of the global temperature datasets upon which the entire climate scare is founded. McIntyre and McKittrick have taken apart the Hansen GISS dataset as discussed above (www.climateaudit.org), of which there's always been suspicion; another researcher has accused Jones (who masterminds the Hadley/CRU dataset) of falsification of his results (<http://www.informath.org/WCWF07a.pdf>); and now NCDC, after exposure of the unsuitable heat-island locations of many of its US temperature stations, has responded by withdrawing from the public domain the list of station locations, which had previously been public for years, vacuously citing "privacy considerations" (www.surfacestations.org)."

Conclusions

Errors of the sort described herein may sometimes lead to either an underestimate or overestimate of temperature trends, whereas other errors may have little impact at all. But one thing is certain, errors are undoubtedly present in all large, complex datasets. In reality, it is impossible to develop the one and only U.S. average temperature or THE global average temperature. There are simply too many confounding factors that cannot be accounted for. Policy makers also need to understand that one certainly cannot project temperature or climate trend decades or centuries into the future, however stridently the CGM modelers promulgate their wares.⁴

So, next time you encounter a breathless announcement that we have set another "all-time record" high temperature, first realize that there is always a level of uncertainty in both what is being measured and how it is being compiled and interpreted. And second, reflect upon the fact that such records have absolutely no meaning unless they take account of the natural cyclicities that are present in all climatic data.

⁴ See: http://scienceandpublicpolicy.org/monckton_papers/the_mathematical_reason_why_long-run_climatic_prediction_is_impossible.html

Has the earth been in a modern warming cycle coming out of the Little Ice Age? Yes. Is it therefore significant that any given year should be a couple of hundredths of degrees warmer or cooler , give or take, from some other nearby year in the record? Of course not . Unless, that is, someone is trying to sell you something, to con you, to raise taxes, to increase the reach of the state, or is simply trying to be elected President of the United States – or perhaps even all of the above.

SPPI Note: *The question may arise as to why a paper dealing with issues of science would append internet blog posts (below).*

The public revelations of the highly consequential information and “audit” of the GISS temperature series, as with the “hockey stick” audit before it, did not first appear in mainstream journals like Nature or Science. So, the larger and more critical question is: Why not?

Appendix I – Popular blog post on USHCN temperature data concerns

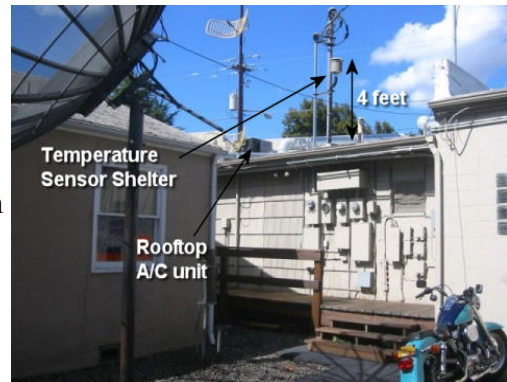
<http://newsbusters.org/blogs/noel-sheppard/2007/08/10/un-s-ipcc-accused-possible-research-fraud>

Will Media Ever Investigate Accuracy of Weather Stations?

By [Noel Sheppard](#) | June 18, 2007 - 15:30 ET

Assume for a moment there was evidence some weather stations around the country were underestimating mean temperatures. Would a media fixated on expanding climate change alarmism investigate and report this phenomenon to demonstrate that the planet was actually warmer than people think?

“60 Minutes,” “20/20,” and “Dateline” would have all done rather lengthy exposés into the matter, correct?



Well, a former meteorologist for the CBS-TV affiliate KHSL in Redding, California, by the name of Anthony Watts has examined 48 of the 1221 weather stations in the 48 lower states, and found irregularities that could be skewing the data upward.

Watts [reported](#)⁵ his first startling finding on this subject at his “Watts Up With That?” website on May 9, 2007 (emphasis added throughout):

To get an idea of the measurement environment that exists today at stations used to gather climate data, I visited the Chico State University Fram on Hegan Lane, south of the city, to do a site survey in the format done by [Dr. Roger Pielke of Colorado State University](#)⁶. This station is part of the US Historical Climate Network of weather stations that have been used as the source for surface temperature data in many climate models and studies. There were some interesting discoveries.

[...]

1. There are missing louvers on the north side of the [Cotton Region Shelter] containing the automated data logger and temp/dp sensor
2. There is clear evidence that both shelters have been repainted with latex paint, including brush marks and drip marks.

⁵ http://www.norcalblogs.com/watts/2007/05/site_survey_weather_station_of.html

⁶ <http://climatesci.colorado.edu/publications/R-321.pdf>

3. **There is an asphalt road that curves around the site**, from the southwest to the southeast
4. **The surface at the site is mixture of gravel, soil, and debris. There is no grass.**
5. There is a water filled evapo-transpiration pan within 10 feet of each CRS, its lineage seems to indicate it goes back to the establishment of the site in 1963
6. **The fiberglass composite NEMA electronics enclosure containing the data logger, radio modem, and solar battery charger are placed inside the CRS within 6-8 inches of the temperature/dp sensor. The 12 volt gel cell battery is also inside the CRS. These items may introduce a heat bias from the operating electronics.**

Watts was kind enough to include pictures of the site surveyed.

Since this point, Watts has visited many other weather stations (please visit www.surfacestations.org⁷ for all of his observations) with findings such as [the following in Marysville, California](#)⁸:

Today I visited Marysville's Fire Station, just off Hwy 70 at 9th and B Street, where they have the station of record for the city using the MMTS electronic sensor installed by the National Weather Service. The data from this station is part of the USHCN (US Historical Climatological Network) and is used in the computer modeling used to predict climate change.

The Marysville station is located behind the fire department **building on a patio and is probably the worst site visited so far. In addition to the sensor being surrounded by asphalt and concrete, it's also within 10 feet of buildings, and within 8 feet of a large metal cell tower that could be felt reflecting sunlight/heat. And worst of all, air conditioning units on the cell tower electronics buildings vent warm air within 10 feet of the sensor. Oh and lets not forget the portable BBQ the firefighters use a "couple times a week."** The area has been constantly added to, what was once a grass rear yard was turned to a parking lot, then more buildings added, then a cell tower with one, then two electronics buildings and the air conditioners...no report on how long the firefighters were BBQ'ing back there, when they figured out why I was asking all the questions they clammed up.

I can tell you with certainty, the temperature data from this station are useless.

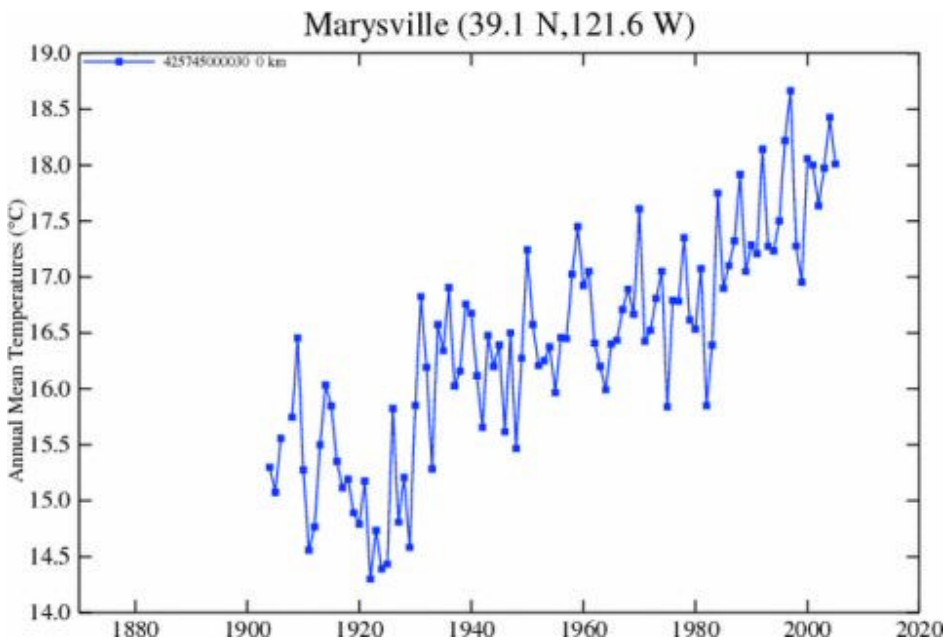
To give you an idea of just how useless, take a look at the picture of this weather station:

⁷ <http://www.surfacestations.org/>

⁸ http://www.norcalblogs.com/watts/2007/05/how_not_to_measure_temperature.html

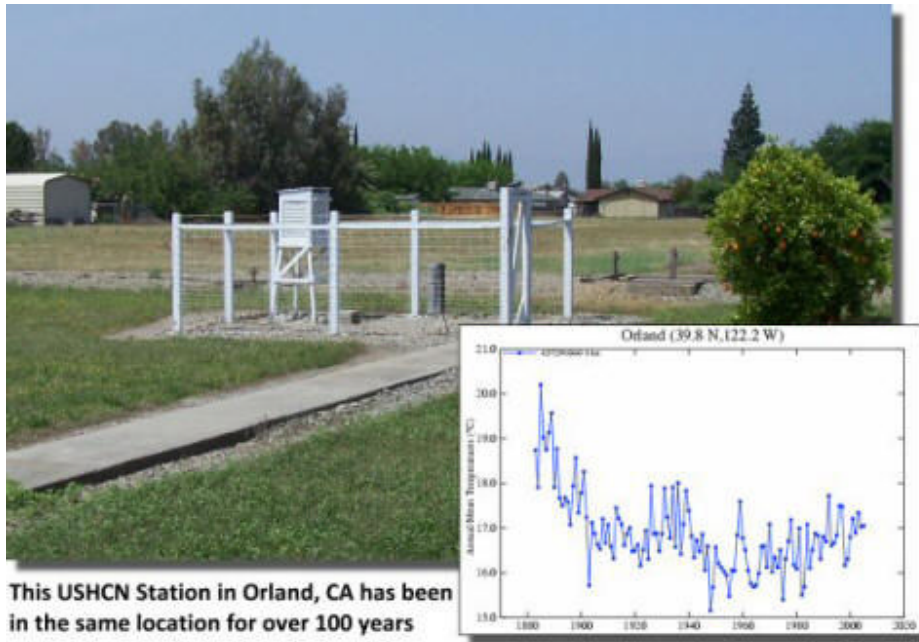


Here is the mean temperature recorded by the Marysville station since the early 1900s:



Yet, as Watts pointed out, there's another station 50 miles away in Orland, California, which is not surrounded by buildings, air conditioners, asphalt, a parking lot, or a cell tower. Take a look at a picture of how a weather station should be set up, and the insert of

mean temperatures reported from said station which are quite different than from the Marysville station just 50 miles away:



As Watts correctly pointed out, “It’s [sic] obvious that Marysville is measuring UHI (Urban Heat Island) effects.”

What this means is that the Marysville station is defeating the purpose of placing a temperature recorder outside of a major metropolitan area by creating an environment that looks nothing like a rural one. As a result, it is quite likely that the temperature readings at Marysville are being upwardly skewed by the environs.

As you might imagine, these are but two examples of sites visited by Watts, and the reader is encouraged to go [here](#) and [here](#) for more of his research.

Yet, the bigger question is why haven’t journalists looked into this matter? Isn’t this considered newsworthy?

Bill Steigerwald of the Pittsburgh Tribune-Review certainly believes so given his Sunday [article](#)⁹ on this subject (emphasis added):

To assure accuracy, stations (essentially older thermometers in little four-legged wooden sheds or digital thermometers mounted on poles) should be 100 feet from buildings, not placed on hot concrete, etc. But as photos on Watts' site show, the station in Forest Grove, Ore., stands 10 feet from an air-conditioning exhaust vent. In Roseburg,

⁹ http://www.pittsburghlive.com/x/pittsburghtrib/opinion/columnists/steigerwald/s_513013.html

Ore., it's on a rooftop near an AC unit. In Tahoe, Calif., it's next to a drum where trash is burned.

Watts, who says he's a man of facts and science, isn't jumping to any rash conclusions based on the 40-some weather stations his volunteers have checked so far. **But he said Tuesday that what he's finding raises doubts about NOAA's past and current temperature reports.**

"I believe we will be able to demonstrate that some of the global warming increase is not from CO2 but from localized changes in the temperature-measurement environment."

Any questions as to why major media outlets are not at all concerned with the accuracy of America's weather stations?

—Noel Sheppard is an economist, business owner, and Associate Editor of NewsBusters.

Appendix II – Blog post #1 on Hansen’s GISS temperature series

Aug 08, 2007

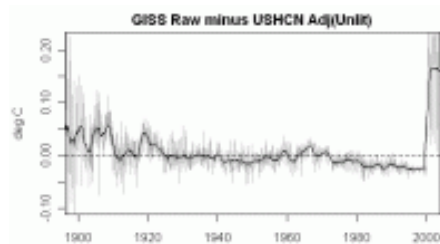
<http://icecap.us/>

Steve McIntyre Catches Error in NASA GISS Temperatures

By Stephen McIntyre, Climate Audit

"I [observed recently](#) that Hansen’s GISS series contains an apparent error in which Hansen switched the source of GISS raw from USHCN adjusted to GHCN for all values January 2000 and later. I’ve collated GISS raw minus USHCN adjusted for all USHCN sites.

Here is a graph showing the difference between GISS raw and USHCN adjusted by month (with a smooth) for unlit stations (which are said to define the trends).



The step in January 2000 is clearly visible and results in an erroneous upward step of about 0.18-0.19 deg C. in the average of all unlit stations. I presume that a corresponding error would be carried forward into the final GISS estimate of US lower 48 temperature and that this widely used estimate would be incorrect by a corresponding amount. The 2000s are warm in this record with or without this erroneous step, but this is a non-negligible error relative to (say) the amounts contested in the satellite record disputes.”

However GHCN did not use the same adjustments and this introduced an upward step in the US average for all years after 2000. Hansen and colleagues didn’t notice until Steve asked them for an explanation. They have now amended their web site and [acknowledged Steve’s contribution](#)¹⁰.

GISS estimated that the error added 0.15 C to each year in the US after 2000. Steve estimated 0.18-0.19 C, but they have refused his request for code to verify their claim. That of course will change the rankings of the recent years.

Icecap note: The GHCN data and approach used by GISS and soon by USHCN is itself seriously flawed. I and others believe if the global data were properly adjusted for urbanization and station siting and land use change issues were addressed, what would

¹⁰ <http://data.giss.nasa.gov/gistemp/>

emerge is a cyclical pattern of rises and falls with much less of any background trend. The whole GW movement is to some degree riding the coattails of the global increase in population and the associated urban heat island effect and other local factors.

Appendix III – Blog post #2 on Hansen’s GISS temperature series

How Important Is NASA’s Change to Historical Climate Data Last Week?

<http://newsbusters.org/blogs/noel-sheppard/2007/08/13/how-important-nasa-s-change-historical-climate-data-last-week>

By [Noel Sheppard](#) | August 13, 2007 - 10:43 ET

Last week's [revelation](#) by Climate Audit's Steve McIntyre of a serious mistake and subsequent changes made by NASA's Goddard Institute for Space Studies in the temperature history of America has created quite a debate in the new media.

While conservative bloggers were quick to point out the hypocrisy regarding the lack of an official announcement from GISS chief James Hansen as well as the possible significance to the entire global warming debate, alarmists such as [RealClimate](#) and [TNR's The Plank](#) viewed McIntyre's discovery and GISS's alterations less than earth shattering.



With that in mind, McIntyre [published a response](#) at Anthony Watts' "Watts Up With That?" Saturday (Climate Audit is undergoing a server change) with his take on the issue (emphasis added throughout):

The Hansen error is far from trivial at the level of individual [weather] stations. Grand Canyon was one of the stations previously discussed at climateaudit.org in connection with Tucson urban heat island. **In this case, the Hansen error was about 0.5 deg C. Some discrepancies are 1 deg C or higher.**

[...]

[A]s you can see from the distribution, **the impact on the majority of stations is substantially higher than 0.15 deg.** For users of information regarding individual stations, the changes may be highly relevant.

GISS recognized that the error had a significant impact on individual stations and took rapid steps to revise their station data (and indeed the form of their revision seems far from ideal indicating the haste of their revision.) **GISS failed to provide any explicit notice or warning on their station data webpage that the data had been changed, or an explicit notice to users who had downloaded data or graphs in the past that there had been significant changes to many U.S. series. This obligation existed regardless of any impact on world totals.**

Readers should certainly be aware that this was what I specifically took issue with - the lack of disclosure that this had occurred:

GISS has emphasized recently that the U.S. constitutes only 2% of global land surface, arguing that the impact of the error is negligible on the global average [sic]. While this may be so for users of the GISS global average, **U.S. HCN stations constitute about 50% of active (with values in 2004 or later) stations in the GISS network** (as shown below). The sharp downward step in station counts after March 2006 in the right panel shows the last month in which USHCN data is presently included in the GISS system. **The Hansen error affects all the USHCN stations and, to the extent that users of the GISS system are interested in individual stations, the number of affected stations is far from insignificant, regardless of the impact on global averages.**

McIntyre then pointed out the hypocrisy in the lack of official reporting of these changes:

In my opinion, it would have been more appropriate for Gavin Schmidt of GISS (who was copied on the GISS correspondence to me) to ensure that a statement like this was on the caption to the U.S. temperature history on the GISS webpage, rather than after the fact at realclimate.

Obviously much of the blogosphere delight in the leader board changes is a reaction to many fevered press releases and news stories about year x being the "warmest year". For example, on Jan 7, 2007, NOAA [announced that](#)

The 2006 average annual temperature for the contiguous U.S. was the warmest on record.

This press release was widely covered as you can determine by googling "warmest year 2006 united states". Now NOAA and NASA are different organizations and NOAA, not NASA, made the above press release, but members of the public can surely be forgiven for not making fine distinctions between different alphabet soups. **I think that NASA might reasonably have foreseen that the change in rankings would catch the interest of the public and, had they made a proper report on their webpage, they might have forestalled much subsequent criticism.**

In addition, while Schmidt describes the changes atop the leader board as "very minor re-arrangements", **many followers of the climate debate are aware of intense battles over 0.1 or 0.2 degree (consider the satellite battles.)** Readers might perform a little thought experiment: **suppose that Spencer and Christy had published a temperature history in which they claimed that 1934 was the warmest U.S. year on record and then it turned out that they had been a computer programming error opposite to the one that Hansen made, that Wentz and Mears discovered there was an error of 0.15 deg C in the Spencer and Christy results and, after fixing this error, it turned out that 2006 was the warmest year on record. Would realclimate simply describe this as a "very minor re-arrangement"?**

Not a chance. In fact, this would have been announced with great enthusiasm, and likely would have been the lead report on all of the evening news programs, as well as making front page headlines the following day:

So while the Hansen error did not have a material impact on world temperatures, **it did have a very substantial impact on U.S. station data and a "significant" impact on the U.S. average. Both of these surely "matter" and both deserved formal notice from Hansen and GISS.**

Yet, something that has been lost in the fight over this issue is that as a result of identifying this Y2K error by Hansen et al, McIntyre has grown more concerned about the veracity of other data being collated and disseminated by GISS, as well as the lack of transparency concerning adjustments to raw data to compensate for the heat island effect:

In the course of reviewing quality problems at various surface sites, among other things, I compared these different versions of station data, including a comparison of the Tucson weather station shown above to the Grand Canyon weather station, which is presumably less affected by urban problems. This comparison demonstrated a very odd pattern discussed [here](#). **The adjustments show that the trend in the problematic Tucson site was reduced in the course of the adjustments, but they also showed that the Grand Canyon data was also adjusted, so that, instead of the 1930s being warmer than the present as in the raw data, the 2000s were warmer than the 1930s, with a sharp increase in the 2000s.**

Now some portion of the post-2000 jump in adjusted Grand Canyon values shown here is due to Hansen's Y2K error, but it only accounts for a 0.5 deg C jump after 2000 and does not explain why Grand Canyon values should have been adjusted so much. In this case, the adjustments are primarily at the USHCN stage. The USHCN station history adjustments appear particularly troublesome to me, not just here but at other sites (e.g. Orland CA). **They end up making material changes to sites identified as "good" sites and my impression is that the USHCN adjustment procedures may be adjusting some of the very "best" sites (in terms of appearance and reported history) to better fit histories from sites that are clearly non-compliant with WMO standards (e.g. Marysville, Tucson).** There are some real and interesting statistical issues with the USHCN station history adjustment procedure and it is ridiculous that the source code for these adjustments (and the subsequent GISS adjustments - see bottom panel) is not available/ [sic]

Adding it up and data from seemingly good weather stations is being adjusted up for reasons that McIntyre can't explain, and Hansen and company refuse to provide the procedure and the source code such that folks like McIntyre - and policymakers - can review the methodology.

Why is all this a big secret, and why should any American citizen or politician just blindly accept data from an agency that refuses to make transparent what the station history adjustment procedure is?

If one views the above assessment as a type of limited software audit (limited by lack of access to source code and operating manuals), **one can say firmly that the GISS software had not only failed to pick up and correct fictitious steps of up to 1 deg C, but that GISS actually introduced this error in the course of their programming.**

According to any reasonable audit standards, one would conclude that the GISS software had failed this particular test. While GISS can (and has) patched the particular error that I reported to them, **their patching hardly proves the merit of the GISS (and USHCN) adjustment procedures.** These need to be carefully examined. This was a crying need prior to the identification of the Hansen error and would have been a crying need even without the Hansen error.

One practical effect of the error is that **it surely becomes much harder for GISS to continue the obstruction of detailed examination of their source code and methodologies after the embarrassment of this particular incident.** GISS itself has no policy against placing source code online and, indeed, a huge amount of code for their climate model is online. **So it's hard to understand their present stubbornness.**

Finally, McIntyre addressed how the Y2K changes might impact global data (ROW):

In the U.S., despite the criticisms being rendered at surfacestations.org, there are many rural stations that have been in existence over a relatively long period of time; while one may cavil at how NOAA and/or GISS have carried out adjustments, they have collected metadata for many stations and made a concerted effort to adjust for such metadata. On the other hand, **many of the stations in China, Indonesia, Brazil and elsewhere are in urban areas (such as Shanghai or Beijing). In some of the major indexes (CRU, NOAA), there appears to be no attempt whatever to adjust for urbanization.** GISS does report an effort to adjust for urbanization in some cases, but their ability to do so depends on the existence of nearby rural stations, which are not always available. Thus, there [sic] is **a real concern that the need for urban adjustment is most severe in the very areas where adjustments are either not made or not accurately made.**

In its consideration of possible urbanization and/or microsite effects, IPCC has taken the position that urban effects are negligible, relying on a very few studies (Jones et al 1990, Peterson et al 2003, Parker 2005, 2006), each of which has been discussed at length at this site. **In my opinion, none of these studies can be relied on for concluding that urbanization impacts have been avoided in the ROW sites contributing to the overall history.**

Moreover, [Keenan's report last week](#) cast grave doubt about the veracity of Jones et al's 1990 paper on urban effects being negligible.

In sum, though this Y2K error and subsequent changes to America's climate history is not necessarily a smoking gun, the lack of reporting, and consistent refusal on the part of Hansen and Schmidt to share methodologies and source codes surrounding statistical formulae remains a grave concern, as does how much all this impacts the global numbers.

Of course, I'm sure when Hansen and Schmidt get around to seeing how this does indeed relate to world temperatures; they'll be quick in alerting the media.

Alas, unless the changes to global data are deemed miniscule, that could be irrelevant, for with the exception of Fox News, it appears that not one major American press organization felt the revelation of GISS's Y2K error, and how it related to U.S. climate history, was at all newsworthy.

Imagine that.

—*Noel Sheppard is an economist, business owner, and Associate Editor of NewsBusters.*

Appendix IV – Blog post #3 on Hansen’s GISS temperature series

Does Hansen's Error "Matter"? - post by Steve McIntyre

http://www.norcalblogs.com/watts/2007/08/does_hansens_error_matter_gues.html

There’s been quite a bit of publicity about Hansen’s Y2K error and the change in the U.S. leaderboard (by which 1934 is the new warmest U.S. year) in the right-wing blogosphere. In contrast, [realclimate](#) has dismissed it a triviality and the climate blogosphere is doing its best to ignore the matter entirely.

My own view has been that matter is certainly not the triviality that Gavin Schmidt would have you believe, but neither is it any magic bullet. I think that the point is significant for reasons that have mostly eluded commentators on both sides.

Station Data

First, let’s start with the impact of Hansen’s error on individual station histories (and my examination of this matter arose from examination of individual station histories and not because of the global record.) GISS provides an excellent and popular [online service](#) for plotting temperature histories of individual stations. Many such histories have been posted up in connection with the ongoing examination of surface station quality at [surfacestations.org](#). Here’s an example of this type of graphic:

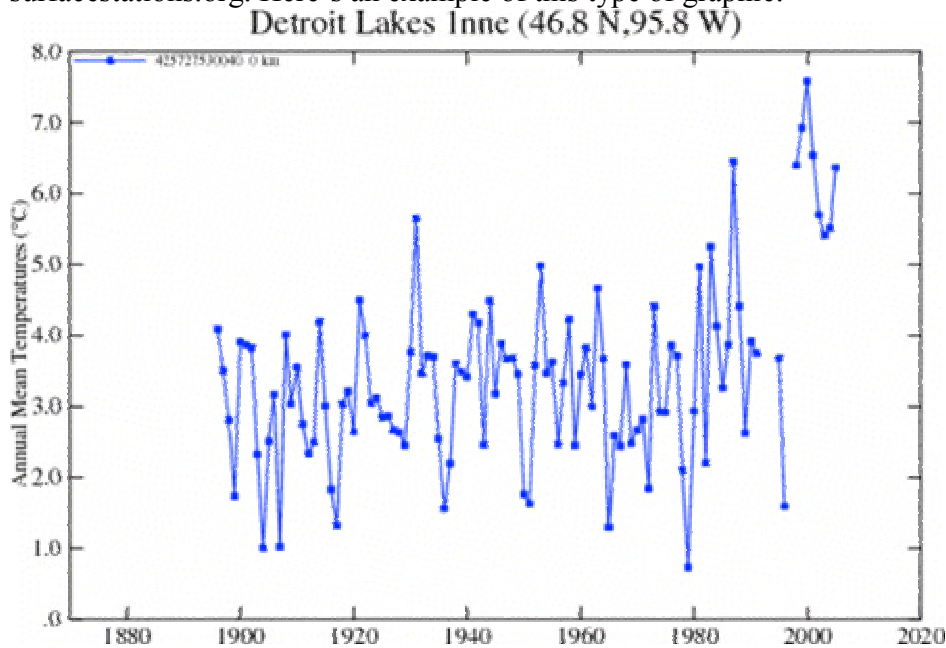


Figure 1. Plot of Detroit Lakes MN using GISS software

But it’s presumably not just Anthony Watts and [surfacestations.org](#) readers that have used these GISS station plots; presumably scientists and other members of the public have used this GISS information. The Hansen error is far from trivial at the level of individual stations. Grand Canyon was one of the stations previously discussed at

climateaudit.org in connection with Tucson urban heat island. In this case, the Hansen error was about 0.5 deg C. Some discrepancies are 1 deg C or higher.

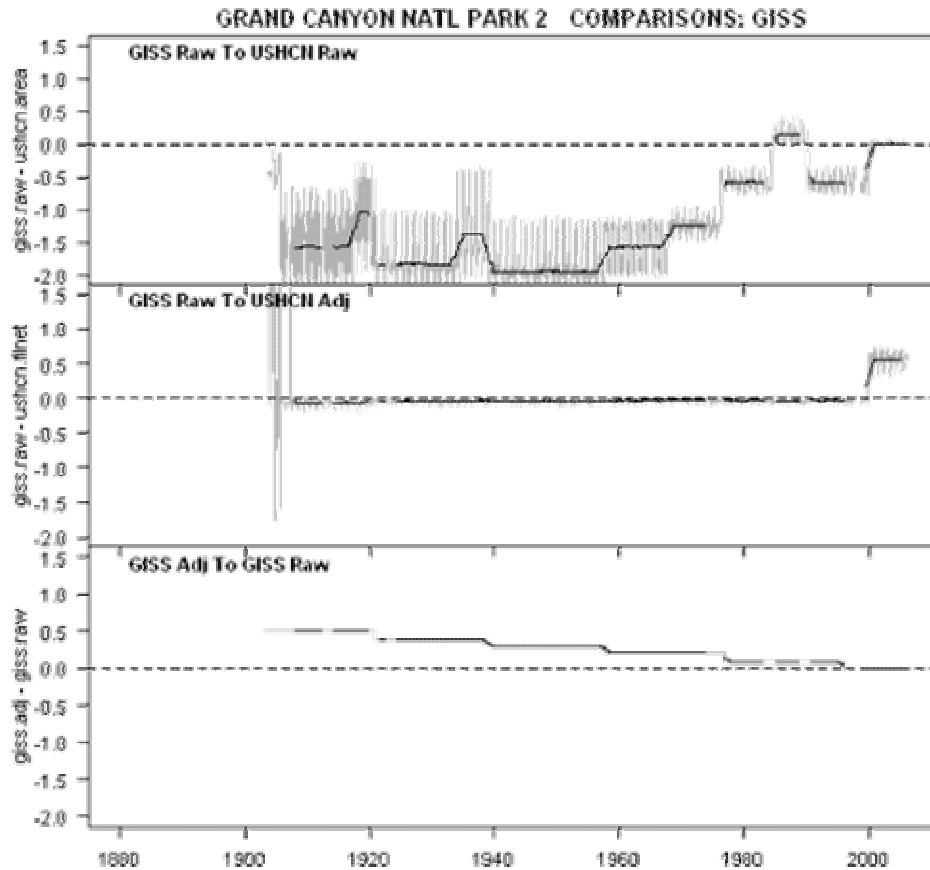


Figure 2. Grand Canyon Adjustments

Not all station errors lead to positive steps. There is a bimodal distribution of errors reported earlier at [CA here](#), with many stations having negative steps. There is a positive skew so that the impact of the step error is about 0.15 deg C according to Hansen. However, as you can see from the distribution, the impact on the majority of stations is substantially higher than 0.15 deg. For users of information regarding individual stations, the changes may be highly relevant.

GISS recognized that the error had a significant impact on individual stations and took rapid steps to revise their station data (and indeed the form of their revision seems far from ideal indicating the haste of their revision.) GISS failed to provide any explicit notice or warning on their station data webpage that the data had been changed, or an explicit notice to users who had downloaded data or graphs in the past that there had been significant changes to many U.S. series. This obligation existed regardless of any impact on world totals.

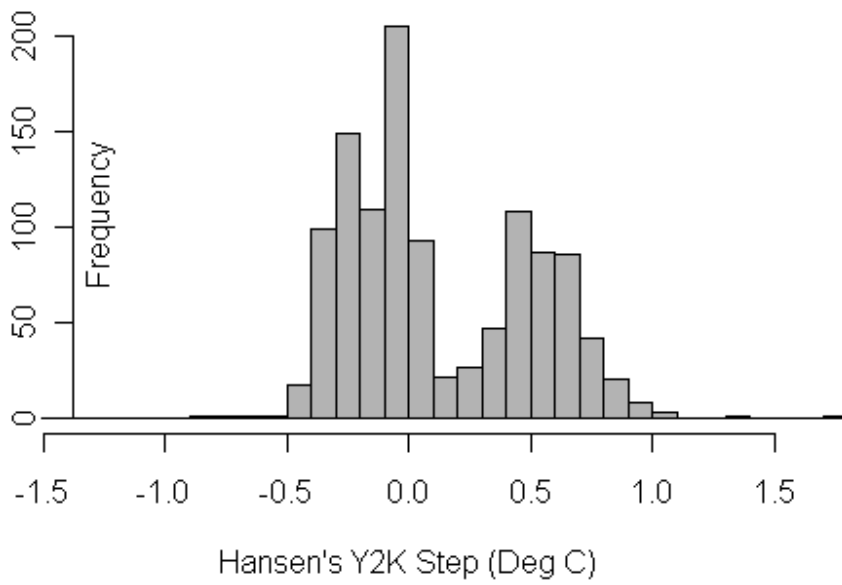


Figure 3. Distribution of Step Errors

GISS has emphasized recently that the U.S. constitutes only 2% of global land surface, arguing that the impact of the error is negligible on the global average. While this may be so for users of the GISS global average, U.S. HCN stations constitute about 50% of active (with values in 2004 or later) stations in the GISS network (as shown below). The sharp downward step in station counts after March 2006 in the right panel shows the last month in which USHCN data is presently included in the GISS system. The Hansen error affects all the USHCN stations and, to the extent that users of the GISS system are interested in individual stations, the number of affected stations is far from insignificant, regardless of the impact on global averages.

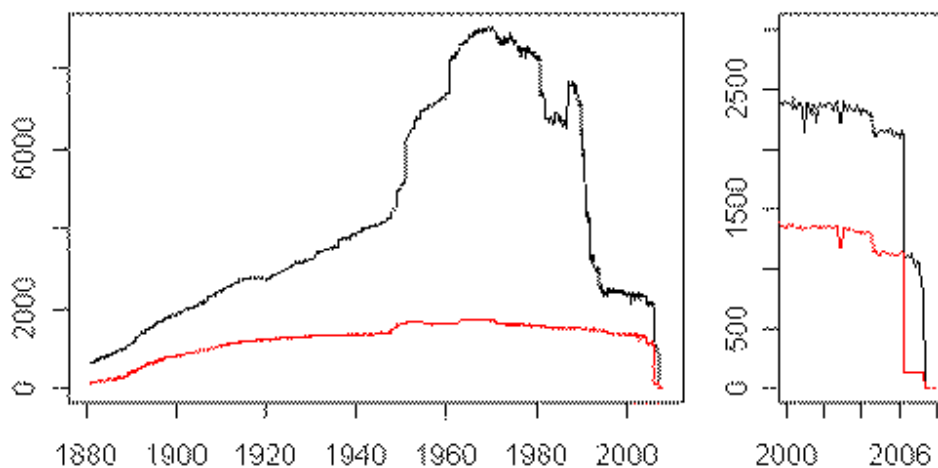


Figure 4. Number of Time Series in GISS Network. This includes all versions in the GISS network and exaggerates the population in the 1980s as several different (and usually similar) versions of the same data are often included.

U.S. Temperature History

The Hansen error also has a significant impact on the GISS estimate of U.S. temperature history with estimates for 2000 and later being lowered by about 0.15 deg C (2006 by 0.10 deg C). Again GISS moved quickly to revise their online information changing their [US temperature data](#) on Aug 7, 2007. Even though Gavin Schmidt of GISS and realclimate [said that](#) changes of 0.1 deg C in individual years were “significant”, GISS did not explicitly announce these changes or alert readers that a “significant” change had occurred for values from 2000-2006. Obviously they would have been entitled to observe that the changes in the U.S. record did not have a material impact on the world record, but it would have been appropriate for them to have provided explicit notice of the changes to the U.S. record given that the changes resulted from an error.

The changes in the U.S. history were not brought to the attention of readers by GISS itself, but in [this post](#) at climateaudit. As a result of the GISS revisions, there was a change in the “leader board” and 1934 emerged as the warmest U.S. year and more warm years were in the top ten from the 1930s than from the past 10 years. This has been widely discussed in the right-wing blogosphere and has been acknowledged at [realclimate](#) as follows:

The net effect of the change was to reduce mean US anomalies by about 0.15 °C for the years 2000-2006. There were some very minor knock on effects in earlier years due to the GISTEMP adjustments for rural vs. urban trends. In the global or hemispheric mean, the differences were imperceptible (since the US is only a small fraction of the global area).

There were however some very minor re-arrangements in the various rankings (see data). Specifically, where 1998 (1.24 °C anomaly compared to 1951-1980) had previously just beaten out 1934 (1.23 °C) for the top US year, it now just misses: 1934 1.25°C vs. 1998 1.23°C. None of these differences are statistically significant.

In my opinion, it would have been more appropriate for Gavin Schmidt of GISS (who was copied on the GISS correspondence to me) to ensure that a statement like this was on the caption to the U.S. temperature history on the GISS webpage, rather than after the fact at realclimate.

Obviously much of the blogosphere delight in the leader board changes is a reaction to many fevered press releases and news stories about year x being the “warmest year”. For example, on Jan 7, 2007, NOAA [announced that](#)

The 2006 average annual temperature for the contiguous U.S. was the warmest on record.

This press release was widely covered as you can determine by googling “warmest year 2006 united states”. Now NOAA and NASA are different organizations and NOAA, not NASA, made the above press release, but members of the public can surely be forgiven for not making fine distinctions between different alphabet soups. I think that NASA might reasonably have foreseen that the change in rankings would catch the interest of

the public and, had they made a proper report on their webpage, they might have forestalled much subsequent criticism.

In addition, while Schmidt describes the changes atop the leader board as “very minor re-arrangements”, many followers of the climate debate are aware of intense battles over 0.1 or 0.2 degree (consider the satellite battles.) Readers might perform a little thought experiment: suppose that Spencer and Christy had published a temperature history in which they claimed that 1934 was the warmest U.S. year on record and then it turned out that they had been a computer programming error opposite to the one that Hansen made, that Wentz and Mears discovered there was an error of 0.15 deg C in the Spencer and Christy results and, after fixing this error, it turned out that 2006 was the warmest year on record. Would realclimate simply describe this as a “very minor re-arrangement”?

So while the Hansen error did not have a material impact on world temperatures, it did have a very substantial impact on U.S. station data and a “significant” impact on the U.S. average. Both of these surely “matter” and both deserved formal notice from Hansen and GISS.

Can GISS Adjustments “Fix” Bad Data?

Now my original interest in GISS adjustments did not arise abstractly, but in the context of surface station quality. Climatological stations are supposed to meet a variety of quality standards, including the relatively undemanding requirement of being 100 feet (30 meters) from paved surfaces. Anthony Watts and volunteers of surfacestations.org have documented one defective site after another, including a weather station in a parking lot at the University of Arizona where MBH coauthor Malcolm Hughes is employed, shown below.



Figure 5. Tucson University of Arizona Weather Station

These revelations resulted in a variety of aggressive counter-attacks in the climate blogosphere, many of which argued that, while these individual sites may be contaminated, the “expert” software at GISS and NOAA could fix these problems, as, for example [here](#) .

they [NOAA and/or GISS] can “fix” the problem with math and adjustments to the temperature record.

[or here:](#)

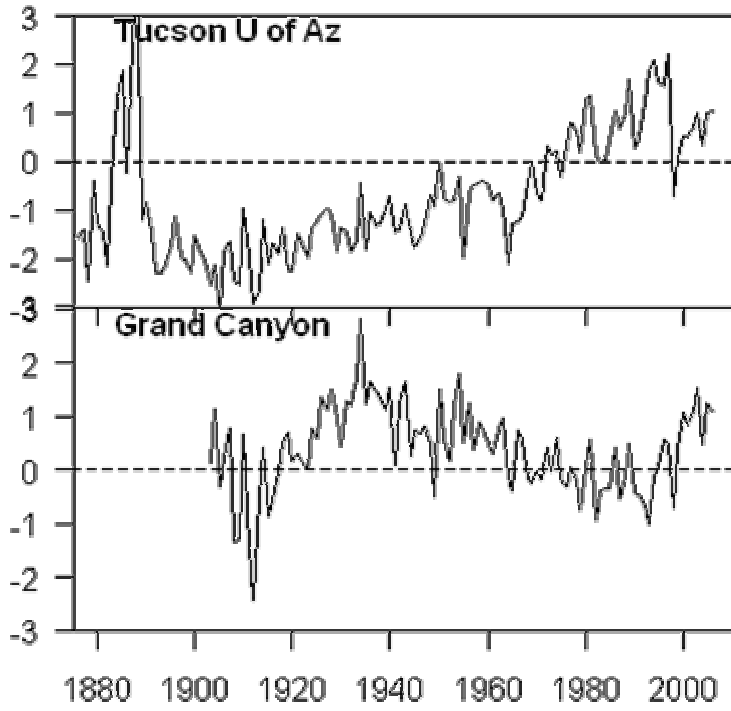
This assumes that contaminating influences can't be and aren't being removed analytically.. I haven't seen anyone saying such influences shouldn't be removed from the analysis. However I do see professionals saying “we've done it”

“Fixing” bad data with software is by no means an easy thing to do (as witness Mann's unreported modification of principal components methodology on tree ring networks.) The GISS adjustment schemes (despite protestations from Schmidt that they are “clearly outlined”) are not at all easy to replicate using the existing opaque descriptions. For example, there is nothing in the methodological description that hints at the change in data provenance before and after 2000 that caused the Hansen error. Because many sites are affected by climate change, a general urban heat island effect and local microsite changes, adjustment for heat island effects and local microsite changes raises some complicated statistical questions that are nowhere discussed in the underlying references (Hansen et al 1999, 2001). In particular, the adjustment methods are not techniques that can be looked up in statistical literature, where their properties and biases might be discerned. They are rather ad hoc and local techniques that may or may not be equal to the task of “fixing” the bad data.

Making readers run the gauntlet of trying to guess the precise data sets and precise methodologies obviously makes it very difficult to achieve any assessment of the statistical properties. In order to test the GISS adjustments, I requested that GISS provide me with details on their adjustment code. They refused. Nevertheless, there are enough different versions of U.S. station data (USHCN raw, USHCN time-of-observation adjusted, USHCN adjusted, GHCN raw, GHCN adjusted) that one can compare GISS raw and GISS adjusted data to other versions to get some idea of what they did.

In the course of reviewing quality problems at various surface sites, among other things, I compared these different versions of station data, including a comparison of the Tucson weather station shown above to the Grand Canyon weather station, which is presumably less affected by urban problems. This comparison demonstrated a very odd pattern discussed [here](#). The adjustments show that the trend in the problematic Tucson site was reduced in the course of the adjustments, but they also showed that the Grand Canyon data was also adjusted, so that, instead of the 1930s being warmer than the present as in the raw data, the 2000s were warmer than the 1930s, with a sharp increase in the 2000s.

USHCN TOBS Versions



GISS Adj Versions

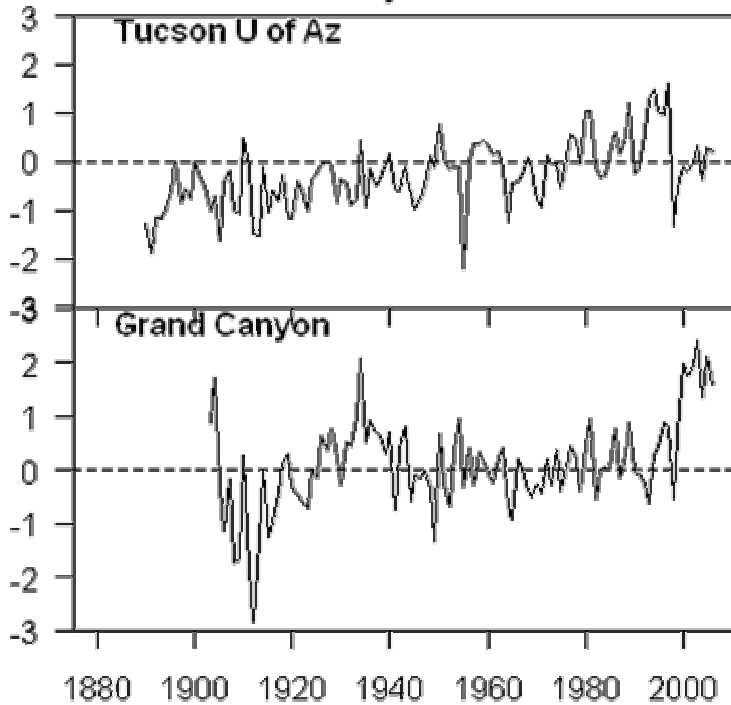


Figure 6. Comparison of Tucson and Grand Canyon Versions

Now some portion of the post-2000 jump in adjusted Grand Canyon values shown here is due to Hansen's Y2K error, but it only accounts for a 0.5 deg C jump after 2000 and does not explain why Grand Canyon values should have been adjusted so much. In this case, the adjustments are primarily at the USHCN stage. The USHCN station history adjustments appear particularly troublesome to me, not just here but at other sites (e.g. Orland CA). They end up making material changes to sites identified as "good" sites and my impression is that the USHCN adjustment procedures may be adjusting some of the very "best" sites (in terms of appearance and reported history) to better fit histories from sites that are clearly non-compliant with WMO standards (e.g. Marysville, Tucson). There are some real and interesting statistical issues with the USHCN station history adjustment procedure and it is ridiculous that the source code for these adjustments (and the subsequent GISS adjustments - see bottom panel) is not available/

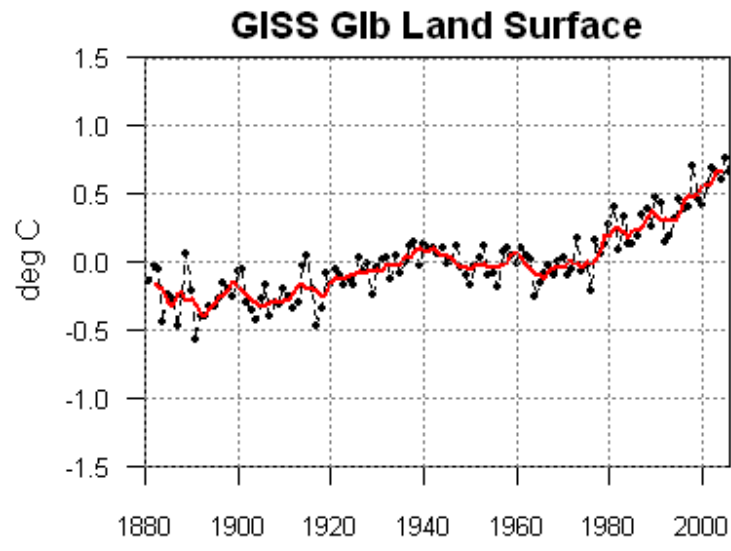
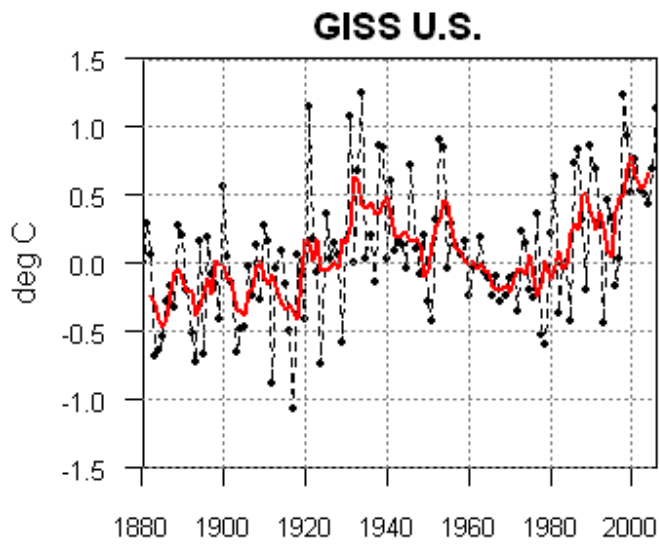
Closing the circle: my original interest in GISS adjustment procedures was not an abstract interest, but a specific interest in whether GISS adjustment procedures were equal to the challenge of "fixing" bad data. If one views the above assessment as a type of limited software audit (limited by lack of access to source code and operating manuals), one can say firmly that the GISS software had not only failed to pick up and correct fictitious steps of up to 1 deg C, but that GISS actually introduced this error in the course of their programming.

According to any reasonable audit standards, one would conclude that the GISS software had failed this particular test. While GISS can (and has) patched the particular error that I reported to them, their patching hardly proves the merit of the GISS (and USHCN) adjustment procedures. These need to be carefully examined. This was a crying need prior to the identification of the Hansen error and would have been a crying need even without the Hansen error.

One practical effect of the error is that it surely becomes much harder for GISS to continue the obstruction of detailed examination of their source code and methodologies after the embarrassment of this particular incident. GISS itself has no policy against placing source code online and, indeed, a huge amount of code for their climate model is online. So it's hard to understand their present stubbornness.

The U.S. and the Rest of the World

Schmidt observed that the U.S. accounts for only 2% of the world's land surface and that the correction of this error in the U.S. has "minimal impact on the world data", which he illustrated by comparing the U.S. index to the global index. I've re-plotted this from original data on a common scale. Even without the recent changes, the U.S. history contrasts with the global history: the U.S. history has a rather minimal trend if any since the 1930s, while the ROW has a very pronounced trend since the 1930s.



Re-plotted from GISS Fig A and GFig D data.

These differences are attributed to “regional” differences and it is quite possible that this is a complete explanation. However, this conclusion is complicated by a number of important methodological differences between the U.S. and the ROW. In the U.S., despite the criticisms being rendered at surfacestations.org, there are many rural stations that have been in existence over a relatively long period of time; while one may cavil at how NOAA and/or GISS have carried out adjustments, they have collected metadata for many stations and made a concerted effort to adjust for such metadata. On the other hand, many of the stations in China, Indonesia, Brazil and elsewhere are in urban areas (such as Shanghai or Beijing). In some of the major indexes (CRU,NOAA), there appears to be no attempt whatever to adjust for urbanization. GISS does report an effort to adjust for urbanization in some cases, but their ability to do so depends on the existence of nearby

rural stations, which are not always available. Thus, there is a real concern that the need for urban adjustment is most severe in the very areas where adjustments are either not made or not accurately made.

In its consideration of possible urbanization and/or microsite effects, IPCC has taken the position that urban effects are negligible, relying on a very few studies (Jones et al 1990, Peterson et al 2003, Parker 2005, 2006), each of which has been discussed at length at this site. In my opinion, none of these studies can be relied on for concluding that urbanization impacts have been avoided in the ROW sites contributing to the overall history.

One more story to conclude. Non-compliant surface stations were reported in the formal academic literature by Pielke and Davey (2005) who described a number of non-compliant sites in eastern Colorado. In NOAA's official response to this criticism, Vose et al (2005) said in effect -

it doesn't matter. It's only eastern Colorado. You haven't proved that there are problems anywhere else in the United States.

In most businesses, the identification of glaring problems, even in a restricted region like eastern Colorado, would prompt an immediate evaluation to ensure that problems did not actually exist. However, that does not appear to have taken place and matters rested until Anthony Watts and the volunteers at surfacestations.org launched a concerted effort to evaluate stations in other parts of the country and determined that the problems were not only just as bad as eastern Colorado, but in some cases were much worse.

Now in response to problems with both station quality and adjustment software, Schmidt and Hansen say in effect, as NOAA did before them -

it doesn't matter. It's only the United States. You haven't proved that there are problems anywhere else in the world.

Appendix V: Keenan Allegation about the Jones temperature data sets

Following discusses some research by Wei-Chyung Wang on global warming, research which Keenan has alleged to be fabricated. For access to numerous active links which further illuminate the issues, see: <http://www.informath.org/apprise/a5620.htm>

[Wei-Chyung Wang](#) is a professor at the [University at Albany](#), State University of New York. He has been doing research on climate for over 30 years, and he has authored or co-authored more than 100 [peer-reviewed](#) scientific papers. He has also received an Appreciation Plaque from the [Office of Science](#) in the U.S.A., commending him, “For your insightful counsel and excellent science. ...”. Yet there is conclusive evidence that some important claims that Wang has made in some of his published work on global warming were fabrications.

I have written a [Report on those claims](#), which details evidence that the claims were fabricated. The report was submitted to the University at Albany on 03 August 2007. Below are additional notes.

1. The term “fabrication” is formally defined by the U.S. government to mean *making up data or results and recording or reporting them*. Fabrication is one of the three officially-defined types of scientific misconduct (the other two being plagiarism and falsification).

2. The cited publications of Wang concern an issue with measurements of global temperature. As a simple example of the issue, consider a thermometer in the middle of a large grassy field. Suppose that there was a city nearby, and over time, the city expanded to replace the field with asphalt and buildings. Then the temperatures recorded by the thermometer would be higher, because asphalt and buildings give off extra heat.

This issue has been a concern in global warming studies, because many thermometers used by weather stations are in areas that have undergone increased urbanization. Such thermometers might show that temperatures were going up, even if the global climate was unchanging. It is widely accepted that some of the increase in measured temperatures during the past century is due to many of the weather stations being located in areas where urbanization has increased. The question is this: how much of perceived global warming is due to such urbanization effects?

3. The latest (2007) assessment report by the IPCC ([Intergovernmental Panel on Climate Change](#)) concludes that such urbanization effects are insignificant overall. One of the main studies cited by the report to justify that conclusion substantially relies on the claims that Wang fabricated—indeed, Wang is a co-author of the study.

The study is authored by Jones et al. (see the reference below). It treats not only China (where Wang was responsible for supplying the data), but also Russia and Australia (where Wang had no responsibility). The regions of Russia and Australia are not considered here, but there is some evidence that they too are problematic.

The study of Jones et al. is not the sole study relied upon by the IPCC report for its conclusion about the insignificance of the urbanization effects. Hence even if the study was wholly invalidated, this would not imply that the conclusion was unsupported. On the other hand, one of the other main studies, by David E. Parker at the [Hadley Centre](#) in the U.K., has since been strongly criticized, both in the peer-reviewed literature and on scholarly blogs.

None of this means that the conclusion of the IPCC is incorrect. It does suggest, though, that a re-evaluation of the evidence would be appropriate.

4. The lead author of Jones et al. is [Phil D. Jones](#). Jones is one of the foremost global warming researchers in the world; he is also one of the two Coordinating Lead Authors of the chapter in the IPCC report subtitled “surface and atmospheric climate change” (here “surface” refers to the surface of the Earth, i.e. where people live). This might be considered the most important chapter of the IPCC report. It is also the chapter that cites the study of Jones et al.

How much did Jones know about Wang's fabrications? As discussed in my Report on Wang's claims, it appears very likely that Jones knew nothing at the time (1990). In 2001, however, Jones co-authored a study, by Yan et al., which considered two meteorological stations in China (at Beijing and at Shanghai). This study correctly describes how the stations had undergone relocations, and it concludes that those relocations substantially affected the measured temperatures—in direct contradiction to the claims of Wang. Thus, by 2001, Jones must have known that the claims of Wang were not wholly true.

On 19 June 2007, I e-mailed Jones about this, saying “this proves that you knew there were serious problems with Wang's claims back in 2001; yet some of your work since then has continued to rely on those claims, most notably in the latest report from the IPCC”. I politely requested an explanation. I have not received a reply.

5. The fabrications of Wang were only discovered after the data for Jones et al. was made available, in April 2007. For years previously, several people, most prominently [Warwick Hughes](#) and [Stephen McIntyre](#), had attempted to obtain this, and other, data from Jones. Jones had refused almost every request. Indeed, in response to requests for data about his work on global temperatures, Jones replied, “Why should I make the data available to you, when your aim is to try and find something wrong with it?”.

Jones is a professor at a public university in the U.K. (the [University of East Anglia](#)). In early 2007, McIntyre and I separately filed formal requests for the data under the U.K. [Freedom of Information Act](#). The university initially refused to release the data. I then drafted a letter to the U.K. [Information Commissioner's Office](#), alleging that the

university was in violation of statute, and sent the draft to the university, asking them to let me know if they believed the letter to be inaccurate. Only then was the data was released.

It is worth noting that obtaining the data was only possible because Jones is in the U.K. In the U.S.A., where Wang is resident, [data for publically-funded research does not have to be disclosed](#).

6. Although the claims of Wang were fabricated, this does not necessarily mean that the conclusion reached by Jones et al. for China is incorrect. It might be that the conclusion is correct, and there is other, valid, evidence to support that.

Since the publication of Jones et al. (1990), there have been several studies on the effects of urbanization on temperature measurements in China. The most recent study, in 2007, is by GuoYu Ren and colleagues at the [Laboratory for Climate Studies](#) in China. This study concludes that a large part of the warming that has been measured in China is due to the effects of urbanization on measurement. (The study is also supported by the analysis of He et al. (2007) for the years 1991–2000.)

Hence the conclusion of Jones et al. does seem to be incorrect. Even if the new study had concluded the same as Jones et al., though, the central issue here—lack of research integrity—would remain valid.

7. A draft of my Report was sent to Wang, who replied as follows.

The only valid scientific issue described in your June 11, 2007 e-mailed pdf file ... concerning our 1990 GRL paper is the "station histories", while others are strictly your own opinions and therefore irrelevant to your inquiry. So let me elaborate further on this issue.

Digitization of the hard copies of "station histories" was prepared in 1989-90 by Ms. Zhao-Mei Zeng (IAP/CAS) only for the 60-station network, while the "station histories" of other stations, including those we used in 1990 urban warming study, were available in paper form, as I have already indicated in my 4/30/07 e-mail to you. Therefore, the use of the word "fabrication" in your document is totally absurd.

Concerning the current status of these hard copies of "station histories", Ms. Zeng told me when I was in Beijing in April 2007, that she no longer has the access to these information because it has been a long time (since 1990) and also IAP has moved office.

...

The reply is contradicted by the DOE/CAS report (Tao et al.), which gives “the most comprehensive, long-term instrumental Chinese climate data presently available”. Moreover, Zeng is a co-author of the DOE/CAS report. Further information is added in my [Report on Wang's claims](#).

The conclusions are clear. First, there has been a marked lack of integrity in some important work on global warming that is relied upon by the IPCC. Second, the insignificance of urbanization effects on temperature measurements has not been established as reliably as the IPCC assessment report assumes.

See also [Allegations of research misconduct](#)
[Remarks on Keenan \[Theor. Appl. Climatol., 2007\]](#)

He J.F., Liu J.Y., Zhuang D.F., Zhang W., Liu M.L. (2007), “Assessing the effect of land use/land cover change on the change of urban heat island intensity”, [Theoretical and Applied Climatology](#). doi: [10.1007/s00704-006-0273-1](#).

IPCC (2007), [Climate Change 2007: The Physical Science Basis](#) (editors—Solomon S., Qin D., Manning M., Chen Z., Marquis M., Averyt K.B., Tignor M., Miller H.L.), Cambridge University Press. [This is the assessment report. Jones is one of the two Coordinating Lead Authors of Chapter 3, on surface climate.]

Jones P. (2007), [Data Used in the Jones et al. \(1990\) Publication](#). [This lists the meteorological stations used by Jones et al. [1990]. The same Chinese stations were used by Wang et al. [1990].]

Jones P.D., Groisman P.Y., Coughlan M., Plummer N., Wang W.-C., Karl T.R. (1990), “[Assessment of urbanization effects in time series of surface air temperature over land](#)”, [Nature](#), 347: 169–172.

McIntyre S. (19 July 2006), [Submission to the Subcommittee on Oversight and Investigations \(Committee on Energy and Commerce, U.S. House of Representatives\)](#). [A sworn statement by McIntyre; the quote from Jones, “Why should I make the data available...?” is on page 22.]

Parker D.E. (2006), “[A demonstration that large-scale warming is not urban](#)”, [Journal of Climate](#), 19: 2882–2895. [This is one of the main works cited by the IPCC [2007] to support the conclusion that urbanization effects on temperature measurements are insignificant. The work has been strongly criticized; the only response from Parker of which I am aware is blogged [here](#).]

Ren G.Y., Chu Z.Y., Chen Z.H., Ren Y.Y. (2007), “Implications of temporal change in urban heat island intensity observed at Beijing and Wuhan stations”, [Geophysical](#)

Research Letters, 34. doi: [10.1029/2006GL027927](https://doi.org/10.1029/2006GL027927). [This argues that a large part of the observed warming in China is due to urbanization effects on measurement.]

Tao Shiyan, Fu Congbin, Zeng Zhaomei, Zhang Qingyun (1997), *Two Long-Term Instrumental Climatic Data Bases of the People's Republic of China*, ORNL/CDIAC-47, NDP-039 (Oak Ridge TN: Oak Ridge National Laboratory). [This report resulted from a joint research project by the [U.S. Department of Energy](#) and the [Chinese Academy of Sciences](#). It contains conclusive evidence that Wang's claims were fabricated. The first version of the report was published in 1991; its Appendix B, which contains station histories, is identical to Table 1 in this version.]

Wang W.-C., Zeng Z., Karl T.R. (1990), “[Urban heat islands in China](#)”, *Geophysical Research Letters*, 17: 2377–2380. [This is one of the two research papers that rely on the claims that were fabricated by Wang (the other is by Jones et al.).]

Yan Zhongwei, Yang Chi, Jones P. (2001), “[Influence of inhomogeneity on the estimation of mean and extreme temperature trends in Beijing and Shanghai](#)”, *Advances in Atmospheric Sciences*, 18: 309–321. [This demonstrates that Jones knew that some of Wang's claims were untrue. (The meteorological stations studied are #54511 and #58367.)]

[Douglas J. Keenan](#)

Robert Ferguson, President
bferguson@sppinstitute.org

209 Pennsylvania Ave., SE suite 299
Washington, D.C. 20003
www.scienceandpublicpolicy.org (202) 288-5699