

To: Section 515 Quality of Information Officer
15, 2009

August

National Aeronautics and Space Administration

From: Charles Allen

preferred communication method: e-mail

This e-mail was electronically submitted on 8/15/2009 to infoquality@hq.nasa.gov

and to Annette.moore-1@nasa.gov per the webpage:
<http://www.sti.nasa.gov/qualinfo.html>

This letter takes the form of a narrative at the beginning, then the formal language required for an official Request for Correction per NASA's Quality of Information guidelines, followed by appended supporting material.

WHY IS THIS BEING SUBMITTED?

Quite simply, this is being submitted because the informal feedback methods of asking for correction have failed. Had I received a timely, non-condescending answer, this formal request would be unnecessary.

WHAT INFORMATION IS INVOLVED?

A variety of information presented on the webpage
<http://climate.nasa.gov/keyIndicators/index.cfm>
entitled Climate Change: Key Indicators. This webpage can also be reached by clicking on "Key Indicators" on the webpage <http://climate.nasa.gov/>.

HISTORY OF ATTEMPTS TO CORRECT

4 weeks ago on July 19, 2009, while looking at recent sea level information on this page I noted that it differed from that on the U of Colorado sea level change page, <http://sealevel.colorado.edu> and the graph that most closely matched the captions on the JPL NASA page,
http://sealevel.colorado.edu/current/sl_ib_ns_global.jpg.

On the JPL NASA page <http://climate.nasa.gov/keyIndicators/index.cfm>, the graph titled 1993 - Present, the caption internal to the graph reads "3.4mm per year (estimate)", and there is both a data plot (smoothed with a 60 day filter although not noted as such) and a linear trend line drawn over the data. One would naturally assume that the trend line drawn on a chart with the label 3.4 mm per year would be drawn at a slope of 3.4 mm per year. That is not the case.

The drawn line passes through -20mm at the beginning of 1994, and through the point labeled +22mm, June 2009. 15 years at 3.4mm is a rise of 51mm, but the line rises only 42mm over a period of 15-1/2 years. Clearly, something is wrong -- either the plotted data is incorrect, or the Y-axis is improperly labeled, or some a simple mistake in plotting a straight line has been made. To assist in visualizing the magnitude of the error, I have downloaded that image and added a red line from 1994, -20mm to 2006, +20mm. The slope of that line is of course, 40mm/12 years or 3.34mm per year. As can easily be seen, this line has a greater slope than the data and a greater slope than the trend line (which according to the caption should be 3.4 mm/yr and higher slope than the red line).

No problem. I just went to the bottom of the webpage and sent a feedback into the "site manager" on July 19th. No response or acknowledgement, so after a few days, so I send in another feedback via the webpage, this time to the webmaster. The Webmasters response is "I only put the information on the website that I'm given. All I can do is forward this on to the website owner."

On 7/24/09 the site manager responds "Dear Mr. Allen, Your question was forwarded to an expert in this area, and I'm still awaiting the response. (I'm a web producer, not a scientist). I apologize for the delay."

TYPOGRAPHICAL ERROR INTRODUCED

Initially, the Sea Level section of the webpage had a notation "Last updated 07.15.09"

Around this time, although I could see no other changes to the website, that section was changed to "Last updated 07.51.09", which I interpret as the update being performed on July 51st, 2009. Part of the Quality of Information Guidelines address data integrity. This change calls into question the integrity of the webpage information.

REQUEST FOR ADDITIONAL CLARIFICATION

Upon receiving the 7/24/2009 communication from the site manager that the question was being forwarded to an expert in this area, I responded with an additional request for clarification on the historical graph adjacent to the one under consideration. "Please also ask your expert for a source for the 1880 to 1990 sea level data, particularly which 23 tidal stations were chosen. Since land changes elevation significant due to seismic events and rebound from the ice age, the choice of which tidal stations are used make a dramatic difference in the apparent sea level trend."

RESPONSE FROM JPL NASA

On August 5th, 2009 the site manager had received feedback from the expert and sent the response

"Dear Mr. Allen,

We've received a several inquiries recently about the sea level data and are currently revising the page to clarify a few things and to incorporate

updated data about the long-term trend. In the meantime, here are comments from oceanographer Josh Willis:

“The data comes from the best fit trend lines and with all the bumps and wiggles it is easy to read off a few values and get numbers that are different. These data are downloadable from the linked sources, I believe, and folks are welcome to grab them and do their own best fits.”

The error of which I requested correction is not a subjective thing of which bumps or wiggles are used to define the endpoints of the line. The problem, as noted in my initial feedback to JPL NASA is a mistake (gross error or blunder) in the line, not a subtle error or a difference of points chosen to plot from.

But I say, “No problem, they are going to draw up a new graph anyway, so the error will be corrected”. Unfortunately, as of today, August 15th, 2009, the website is exactly as it was on the day of my initial feedback on July 19th, 2009, with the sole apparent exception being that the section above the Sea Level graph was changed to show that the graph was updated on July 51st instead of the original July 15th.

OTHER ERRORS

Meanwhile, I decided to look at the other data on this webpage, <http://climate.nasa.gov/keyIndicators/index.cfm> , and noted a problem with the plot of GLOBAL AVERAGE TEMPERATURE.

It appears to have a series of bars for annual average global temperature, but although it is shown as being last updated 5.19.08, it shows an annual average global temperature for 2008. I suspect that the data plotted for 2008 is just for the first two months of 2008. Or perhaps it has been updated, but the last update date was not changed. It also differs from the listed source in that the smoothed plot on the JPL NASA page ends with a perfectly flat line, while the source data at CRU, shows a slight downturn over the last few years. The smoothing algorithm and endpoint conditions on the CRU graph are not specified, but appear to be a 20 year half amplitude smoothing filter, with the final average data point extended beyond 2008 in order to extend the smooth curve to the end of observed data. I know of no possible smoothing and endpoint algorithm that could replicate the graph shown on the NASA Key Climate Indicators page.

The JPL NASA graph has a somewhat different rhetorical effect than the graph at the Hadley Centre of the UK Met Office, <http://hadobs.metoffice.com/hadcrut3/diagnostics/comparison.html> .

The smoothing on that graph, based upon the same CRU data, is specified to be a 21 point binomial filter. This filter characteristics very similar to the 13 point Gaussian filter recommended by the IPCC 4th Synthesis Report, Working Group1 at the end of Chapter 3.

end of narrative.

REQUEST FOR CORRECTION OF INFORMATION by NASA under NASA's INFORMATION QUALITY GUIDELINES

This request is submitted pursuant to Section 515 of public law 106-553 and the National Aeronautics and Space Administration Guidelines for Ensuring the Quality of Information.

My name is Charles Allen, phone number 408-836-5939, and my preferred mechanism for receiving a written response from NASA is via e-mail to

My mailing address is
Charles Allen

I have no organizational affiliation.

I hereby request that NASA review and correct their system and policies for ensuring the quality of information on webpages
<http://climate.nasa.gov/> and
<http://climate.nasa.gov/keyIndicators/index.cfm>

I hereby request that since the data used for the Global Average Temperature plot is based upon confidential raw data that cannot be released to outside parties for an independent verification, audit, and replication of the value-added HADCRUT3 temperature product, that NASA either include a statement that this data is non-verifiable; or that NASA in conjunction with other US government agencies perform a proper due diligence review of the quality, transparency, reproducibility, and validity of this highly influential scientific product widely used throughout the US government in making important public policy decisions such as the "Cap and Trade" law.

I request that NASA make the following specific clarifications and corrections and additions to <http://climate.nasa.gov/keyIndicators/index.cfm>

1. Change the last updated note on the sea level graph to a valid data. July 51st, 2009 is not a valid date.
2. Update the graph on Sea Level Trends 1993-present. Specifically, the data should more accurately reflect the linked source data. To show the level of variations in the readings, it would be useful to both show the actual data points and the 60 day smoothed plot, as well as a long term trend line. I recommend that NASA simply use the graph on the University of Colorado website as is, reformatted for size.

3. The adjacent graph on historical sea level, with the title Historical Data 1880-1990 should also be reviewed.
 - a. The plotted data does not appear to correspond to the graph caption of "Rate of Change 2mm per year".
 - b. The caption below states "Line represents 3 year average, based on 23 annual tide gauge records". Tidal gauge records often have a very strong long term component associated with changes in the elevation of the land. Which 23 stations are chosen is worthy of noting. Please provide a reference to the data.
 - c. It would be helpful to draw a 2mm/year trendline on this chart.
 - d. It would be helpful to have the vertical axis labeled in mm rather than cm. This is because the trend is expressed in mm per year, and the adjacent graph has a vertical axis labeling in mm.

4. In the ICE MASS section of <http://climate.nasa.gov/keyIndicators/index.cfm> the lefthand graph is a picture of Greenland with a key below showing "annual days of melt". None of the sources listed in this section lead to further information on the graph or its meaning.
 - a. I request that this graph either be deleted, or that additional information be provided such that the annual days of melt is presented in historical context. Have the annual days of melt gone up? Is it lower than the historical average? I request that a source for the data and further information be provided.

5. Global Average Temperature section of <http://climate.nasa.gov/keyIndicators/index.cfm>
 - a. Either this graph has been updated since the indicated data of 5.19.08, or it does not have the correct data for the annual average of 2008. Please correct.
 - b. The smoothed plotted line of Global Annual Temperatures appears to be in error. It differs from the graph on the homepage of the CRU. It does not reflect the "smoothed data" listing found at the CRU. Please identify the method of smoothing used and particularly how the data is extended into the future so that the smoothing plot can be extended to 2008 (commonly referred to as endpoint treatments, with terms such as minimum smoothness and minimum roughness referring to how the values for future data is generated to be used in the smoothing algorithm).
 - c. The UK Meteorology Office has this same data series with a plot which is much better documented. If NASA decides to continue to use the HADCRUT3 time series, then I recommend using the graphical method shown at <http://hadobs.metoffice.com/hadcrut3/diagnostics/comparison.html> and using that as the source reference since it clearly defines how the data is plotted.
 - d. The HADCRUT3 data from the University of East Anglia Climate Research

Unit, which is the basis for the Global Average Temperature shown on the JPL NASA Key Climate indication page, has been prepared in ways that are neither transparent nor reproducible. The CRU refuses to release the raw station temperature records which are the basis of this dataset. In addition, the CRU has recently disclosed that the original raw data has been lost, so the CRU itself could not replicate its own work. See <http://www.cru.uea.ac.uk/cru/data/availability/>, particularly the section which states: "Data storage availability in the 1980s meant that we were not able to keep the multiple sources for some sites, only the station series after adjustment for homogeneity issues. We, therefore, do not hold the original raw data but only the value-added (i.e. quality controlled and homogenized) data."

This HADCRU3 temperature data, which is widely used in IPCC reports, US EPA synthesis products, NOAA research and reports, as well as being disseminated by JPL NASA on the webpage <http://climate.nasa.gov/keyIndicators/index.cfm> is in my opinion "highly influential scientific information" as defined by the OMB, NASA, DOC, NOAA, and OSTP Quality of Information Guidelines. In several of those guidelines it is stated where confidentiality or other problems prevent an open transparent review of the data, then especially robust data checking, verification, and independent comparison should be done.

My request is that NASA, either separately or in conjunction with other US government agencies, perform the appropriate due diligence review, verification, replication, and peer review that is appropriate for such an influential data time series as the historical global average temperature, which is widely relied upon for important public policy decisions, such as "Cap and Trade" legislation.

6. It being increasingly recognized that a very key climate indicator is the metric Ocean Heat Content. I request that the webpage <http://climate.nasa.gov/keyIndicators/index.cfm> be expanded to include both a historical Ocean Heat Content graph and a recent Ocean Heat Content graph. I envision a format similar to the historical and recent temperature graphs, or the historical and recent sea level graphs. It is also quite appropriate for JPL NASA to include this information since NASA is involved in the ARGOS project. Indeed, Josh Willis, who responded to my initial inquiry is a good source of data on this. See the NASA article titled "Correcting Ocean Cooling", <http://earthobservatory.nasa.gov/Features/OceanCooling/>. Similar to the recent sea level graph, I recommend that the recent OHC graph go from the start of the ARGOS project to the present, with seasonal variations removed

http://www.nodc.noaa.gov/OC5/3M_HEAT_CONTENT/ with a copy of Levitus 2009 is a good example of what would be a reasonable the historical Ocean Heat Content graph, although I would prefer to have all three of the most commonly referenced OHC historical graphs be plotted since there are significant differences between the three. Ref: doi:10.1029/2008GL037155, 2009

Do not hesitate to contact me, preferably via e-mail at charlie.allen@usa.net if you desire clarification on any of the above comments, requests for correction, or the request for validation of the HADCRU3 temperature product.

Charles Allen

Supplementary information is attached.

Wednesday August 5th, 2009 response from NASA:

From: "Jackson, Randal K (1831)"
To: Charlie Allen
Date: Wed, 5 Aug 2009 09:17:03 -0700
Subject: Re: GCCq: Errors in Sea Level Graphs ??
Thread-Topic: GCCq: Errors in Sea Level Graphs ??
Thread-Index: AcoMwX4EFyIUHpfIQTOkU/vG0FrShwJJqznY
Message-ID: <C69EFE8F.6F9D%
In-Reply-To: <25E0075BD7B14DF188029F29949EE4EF@Fairhaven>

Dear Mr. Allen,

We've received a several inquiries recently about the sea level data and are currently revising the page to clarify a few things and to incorporate updated data about the long-term trend. In the meantime, here are comments from oceanographer Josh Willis:

"The data comes from the best fit trend lines and with all the bumps and wiggles it is easy to read off a few values and get numbers that are different. These data are downloadable from the linked sources, I believe, and folks are welcome to grab them and do their own best fits."

- Randal

From: charlie.allen
Sent: Friday, July 24, 2009 11:27 AM
To: Jackson, Randal K (1831);
Subject: GCCq: Errors in Sea Level Graphs ??

Here is the message submitted by:

Charles Allen

Subject: Errors in Sea Level Graphs ??
Message: The captions on the two sea level graphs updated 7.15.09 dont seem to match the data.

I calculated trends much lower than the captions of 2mm/yr and 3.4mm/yr. The trend line on the 1993-present data also does not correspond to 3.4mm/yr.

Data error? Caption error? Am I misunderstanding and miscalculating?

PLEASE RESPOND. My inquiry of 7/19 seems to have gotten lost.

Referring Page: <http://climate.jpl.nasa.gov/keyIndicators/index.cfm>

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My e-mail to Randal Jackson on 7/24/2009 with a further request for clarification

Thank you for acknowledging my inquiry.

Please also ask your expert for a source for the 1880 to 1990 sea level data, particularly which 23 tidal stations were chosen. Since land changes elevation significant due to seismic events and rebound from the ice age, the choice of which tidal stations are used make a dramatic difference in the apparent sea level trend.

You might also pass on to your expert a link to the original source data for the more recent data:

http://sealevel.colorado.edu/current/sl_ib_ns_global.jpg

This is the graph that matches your caption -- inverse barometer applied, seasonal signals removed.

As you even a non-expert can see, both the graphical data and the trend line differ significantly from what is on the jpl.nasa website. Even if your experts had used older data from U of C, it would not match the graph displayed.

Regards,

Charlie Allen

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Response from Webmaster to my 7/22/09 request to her after not receiving either acknowledgement or response from the online feedback submitted to the site manager on 7/19/09.

I only put the information on the website that I'm given. All I can do is forward this on to the website owner.

Cecelia Lawshe

The file attachment is the sea level graph from <http://climate.nasa.gov/keyIndicators/index.cfm> onto which I drew a red line with the slope of 3.34mm per year. As can easily be seen, that line slopes upward a more rapid rate than either the data or the NASA plotted trendline that the caption identifies as 3.4mm per year. I prepared this graph as my verbal descriptions of the problem, have so far, apparently not been understood by NASA, even though only Junior High School level trigonometry and algebra is involved. If one were to draw a 3.4mm per year trendline on the graph, it would go approximately from -20mm in 1994 to +21 mm in 2006. Clearly, there is some sort of error in the line graphed by NASA, by the data graphed by NASA, or the Y axis on the graph. Although it is quite possible that the graph by NASA used the earlier 2009 release 2 of data from Univ of Colorado, neither the most recent data nor the earlier release 2 data is consistent with the NASA graph.