

On the Stochastic Analysis of Contemporary Global Temperature Data

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Abstract

In a recent paper, Lovejoy et al. found proof beyond doubt that the recent global warming is caused by anthropogenic carbon dioxide in the atmosphere. We will comment here on the scientific accuracy of this statement and come to the conclusion that it is caused by human behavior; either through anthropogenic carbon dioxide, OR that the global warming is the result of data manipulation, which cannot be excluded.

Content

According to many people, the biggest threat our planet and humanity faces is the rise of the average global temperature on this planet. But is it real? The question can, a first step, be divided into: 1) Is the planet indeed warming? 2) If so, is it human caused? Lovejoy, in recent work (Lovejoy 2014b; Lovejoy 2014a) showed that the second question can be answered. He manages to “disprove natural warming” by analyzing the temperature data of the last 150 years in a stochastic model. “to statistically test the hypothesis that the industrial epoch warming is simply a large natural fluctuation . . . the probability (is) so low ($\approx 0.1\%$) that it (can) be dismissed”.

Lovejoy gives here a good contribution to the discussion of the subject. However, his statement does not follow the scientific method and is an example of modern science that is driven by a political agenda. Yet, the University of California at Berkeley (UCB), in their description of science, allows for this kind of biased research, “as long as the entire research system remains scientific”. Before continuing, the parts forgotten by Lovejoy, the gaps left by him in the scientific method, are filled in here by us.

One of the parts of the scientific method is convincing the readers that alternative explanations were considered but were rejected. Moreover, as Feynman states it in his Caltech speech, “Details that could throw doubt on your interpretation must be given” [1]. We do not see any signs of this approach in the aforementioned work of Lovejoy.

Our first and immediate observation when reading the papers was that the conclusion should be “The hypothesis that the warming is caused by humans can be rejected on basis of the data, or that the data have been altered by humans”. This second hypothesis is of course not very welcome and not well studied by part of the researchers, and Lovejoy does not even mention it. Yet, UCB demands from the others (us) that they complement these researchers.

The idea that data have been altered is not farfetched, but is a given fact. The question if the data have been adulterated we leave here in the middle. It is not our task here to prove our new hypothesis, but only to show that it is a reasonable alternative. As an example, Professor Dr. Friedrich Karl Ewert of the University of Paderborn has investigated the allegations and comes to the conclusion “Between the years 2010 and 2012 the data measured since 1881 were altered so that they showed a

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significant warming, especially after 1950. A comparison of the data from 2010 with the data of 2012 shows that NASA-GISS had altered its own data sets so that especially after WWII a clear warming appears – although it never existed.” (German Professor Uncovers Massive GISS Tampering). Generally speaking these ideas are found in so-called ‘skeptics blogs’, for instance the one of Anthony Watts (wattsupwiththat) (How good is the NASA GISS global temperature dataset?). The nicest graphic summary of data tampering can be found at the pages of Steven Goddard (Data Tampering At USHCN/GISS), where a whopping 0.5 OC data correction is presented, basically equal to the contemporary global warming magnitude. Without the corrections, the United States are actually cooling down. Even renowned institutes are skeptics, in some cases even deniers. Here MIT professor Thomas Hafer: “it is worth remembering that the data supporting temperature rise in the United States for the last 50 years is ‘cooked’ ” (A note of caution). At the end, all accusations turn out to be true: the correction factors can be found on the pages of NOAA, the National Climatic Data Center (United States Historical Climatology Network (USHCN) Version 1). (Look for the figure titled “Difference between raw and final USHCN data sets”). Figure 1 shows a correlation plot of the correction factor and the CO₂ concentration in the atmosphere (thus the intensity of the need of a correction factor). It fits with a nearly perfect regression coefficient of 0.98, which raises some serious questions.

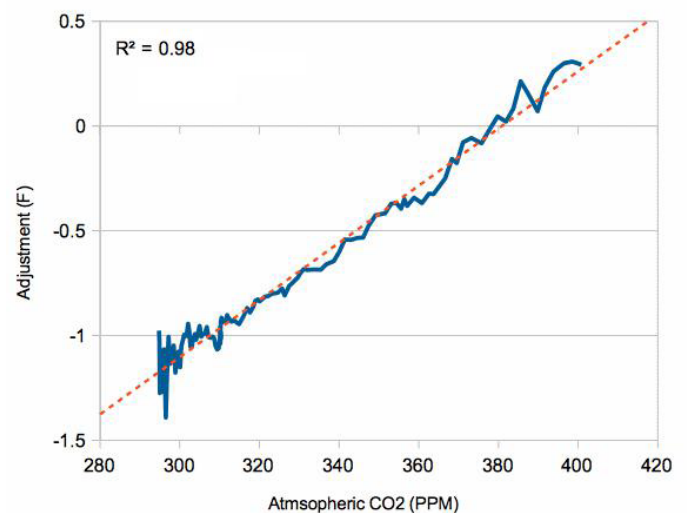
In our honest opinion, the biggest error on temperature readings is caused by the so-called heat-island effect. Energy is consumed inside cities and the resulting heat trapped there. The Figure 1:

In the Figure 1, effect can be easily seen in several degrees, as anyone living in the countryside and working in the cities known. The result is that the city thermometers indicate a higher temperature than the real air temperature. As such, with thermometers more and more being engulfed by cities, temperatures should rather be generally corrected down. The overall correction factor, however, has a trend of going up in time. Correction factors have removed the warm years in the 1930s and even managed to remove the recent and more spoken of pause in the global warming (NOAA temperature record updates and the ‘hiatus’). The dubious character of the corrections have made us rather skeptic, if not suspicious, leaning to the denying side.

Once more, it is not our point to prove that

data have been adulterated or altered, but the key point here is that such a possibility of data alteration cannot be excluded – it is an alternative hypothesis – and thus should be mentioned in a scientific study on the subject of global temperatures. Where Lovejoy leaves behind gaps in the scientific method, we fill them up, to make the research have scientific character. The same gap has been made with the greenhouse hypothesis, where the alternative explanation of the correlation between CO₂ and temperature in historical data, namely Henry’s Law, is often neglected, thereby undermining the scientific method [7].

Figure 1: The correction factor used on the temperature data. Horizontal: Atmospheric CO₂ concentration (the intensity of the need for a correction factor). Vertical: The correction factor on the temperature. This way the warming up of the planet is indeed man-made, but not through CO₂ emissions, but rather through data manipulation.



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