

## Information, Misinformation and the Climate Change Debate

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In a previous commentary [1], I noted that there are two radically different views on the state of the climate. In the mindset of an “alarmist”, the climate has warmed by a significant amount over the past century and human emissions of carbon dioxide are chiefly to blame. The “skeptics” argue that the warming has been within the range of natural variability and is no cause for concern.

One of the reasons this rift exists in the climate community has to do with the information that both sides are using. Or, in some cases, misinformation. The first instance of disputed data (or, as some would say, data tampering), was revealed in the infamous “Climate gate” case (Figure 1).

In 1999, Dr. Michael Mann, Raymond Bradley and Malcolm Hughes created a 1,000 year reconstruction of global climate (Figure 1). The widely disputed “hockey stick” depicted a fairly quiescent climate for nine centuries, followed by an explosive rise in global temperatures. This temperature timeline became the basis for many recommendations formulated in the Intergovernmental Panel on Climate Change Third Assessment Report [2]. Those recommendations were adopted by a large number of national science academies and found their way into a number of policy and funding initiatives. The reconstruction was based on a blended body of instrumental and proxy temperature assessments that contained many flaws and errors [3]. Most notably, a number of long-established features of the climate canon were overturned on some flimsy evidence and questionable statistical analysis. This resulted in the Medieval Warm Period practically disappearing from the climate record along with the Little Ice Age. When asked to produce the data for validation purposes, researchers were initially denied access to the data as well as the computer algorithms used to process that data. The controversy is still brewing with lawsuits, countersuits and defamation-of-character accusations.

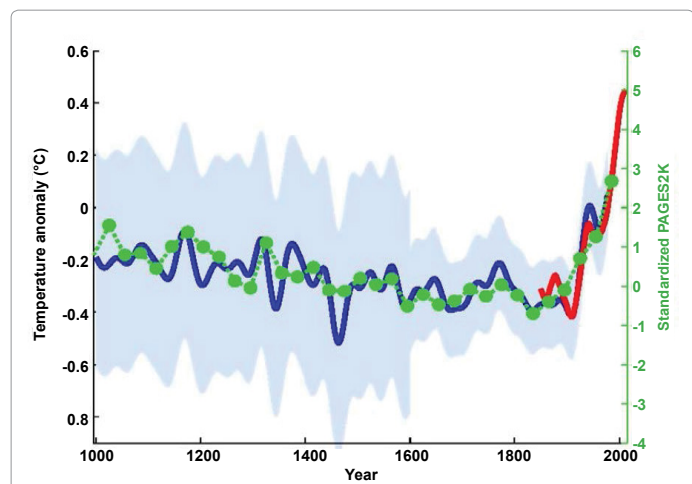
More recently, a new controversy has erupted over revised

temperature trends produced by the National Environmental Information Center (NEIC). The NEIC “adjusted” temperatures run counter to an important position held by the skeptics, who argue that there has been an 18 year “pause” in the global temperature rise. In and of itself, this provides compelling evidence that CO<sub>2</sub> cannot be the driver of global warming, as CO<sub>2</sub> concentrations have raised in monotonic fashion during that time. To arrive at that conclusion, skeptics point to the satellite data sets prepared at the University of Alabama at Huntsville (UAH) and by Remote Sensing Systems (RSS). These datasets have nearly global coverage, are free from surface data contaminants (i.e., urbanization effects, deforestation, etc.), and are considered by some to be the most accurate. Drawbacks include a relatively short time of coverage (i.e., data are only available back to late 1978), along with calibration issues related to satellite drift.

NEIC’s surface data, on the other hand, can be fraught with a wide array of problems, the most widely studied of which is contamination by urbanization. As cities grow around temperature recording sites, the microclimate changes in significant ways and is no longer representative of the surrounding areas. A second suite of problems arises when trying to assess oceanic temperatures. Here, data are collected from a variety of sources to include ships, buoys, and ARGO platforms. Each of these instruments presents special challenges, and significant differences are known in the time series of these data. Therefore, “corrections” to the data must be made in order to evaluate long-term changes in the global climate.

As reported by Dr. John Bates, a well-respected scientist with the National Oceanic and Atmospheric Administration, these “corrections” were released before proper verification protocols were employed [4]. The “Pause buster” paper in question contains, in my opinion, two serious flaws [5]. First, the “corrected” data were accepted at the 0.10 significance level, a level considered too low by most researchers (.05 or .01 significance levels are deemed rigorous in standard practice). The most unusual flaw, though, is the way in which the data were adjusted. The authors admit that the buoy data are more accurate than the ship data, yet the buoy data were adjusted to the ship data. It should have been adjusted in exactly the opposite direction. These “corrections” resulted in a notable rise in global temperatures since 1998, while the RSS data shows virtually no change since that time.

As a final note, there is evidence of suppressed information from this author. Last year, I published a paper showing a strong correlation between mid-ocean geothermal heat release and recent global warming



**Figure 1:** Green dots show the 30 year average of the new PAGES (Past Global Changes) 2k reconstruction. The red curve shows the global mean temperature, according HadCRUT4 data from 1850 onwards. In blue is the original hockey stick with its uncertainty range (light blue). Copyright Wikipedia Commons.

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[6]. Needless to say, the paper lends no support to the anthropogenic warming (i.e., “alarmist”) point of view. The paper has been cited in other scholarly papers and has been featured on a number of popular “skeptical” websites. It has also been viewed by a wide audience, tallying over 8,000 views (hits) according to the publisher (OMICS). This is a fairly remarkable response to an academic research paper. More importantly, the paper was listed on Google Scholar, a prominent search engine designed to disseminate research to the global research community. It first appeared in August 2016, along with an editorial that cited it. However, the paper was abruptly delisted from the Google Scholar search engine five months later (January 2017) without explanation. Oddly enough, the editorial citing the paper is still listed on Google Scholar.

Suppression of new ideas and new information can easily be viewed as a type of misinformation. How creative!

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