

An Inconvenient Truth?

**An Analysis of Al Gore’s “An Inconvenient Truth”
From an Information Design Perspective**

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By Chris O’Leary

I like to think that I am a fairly open-minded person. While it’s true that I tend to vote Republican, at the core I am more of a Libertarian (fiscally conservative and socially liberal). For that reason, I had no problem voting against George Bush in the 2004 election. This was due to reasons related to his management and decision-making style and my perception of his lack of interest in opposing points of view.

In an effort to stay true to my ideal of being open-minded, after watching last weekend’s Live Earth concerts I decided to take another look at Al Gore’s book “An Inconvenient Truth” and reassess my position with respect to global warming.

I have to admit that Al Gore makes a very strong circumstantial case for his position. In particular, I found the historical comparisons of glacier size to be extremely effective.¹ However, in reviewing the book I found a significant, but subtle, problem that only serves to reinforce, rather than reduce, my skepticism.

I am very knowledgeable about the tricks that people use to try to win arguments; how they can manipulate and massage data to make their points more convincing. I learned this through years of following the work of Edward Tufte, a former professor at Yale University and the preeminent teacher of the principles of Information Design.

One thing Edward Tufte has spent a significant amount of time documenting in his books is how people can manipulate data, and how it is presented, to make their point.² This includes using such tricks as manipulating the baseline of charts and graphs.

On page 64 and 65 of “An Inconvenient Truth”, Al Gore does something that makes my Tufte-trained radar sound an alarm. On these pages he presents a chart entitled “1000 Years of Northern Hemisphere Temperature” that is based on the work of Lonnie Thompson and that, at first glance, I found to be very persuasive. In short, it shows Northern Hemisphere temperatures rocketing upward in a quite pronounced hockey-stick shape (see Figure 1).

However, in coming back to this diagram several times, and studying it in detail, I found several problems with it that fall into the realm of the deceptive. Basically, what I see are the use of a number of tricks that are frequently used to increase the impact of one’s case (regardless of its merits).

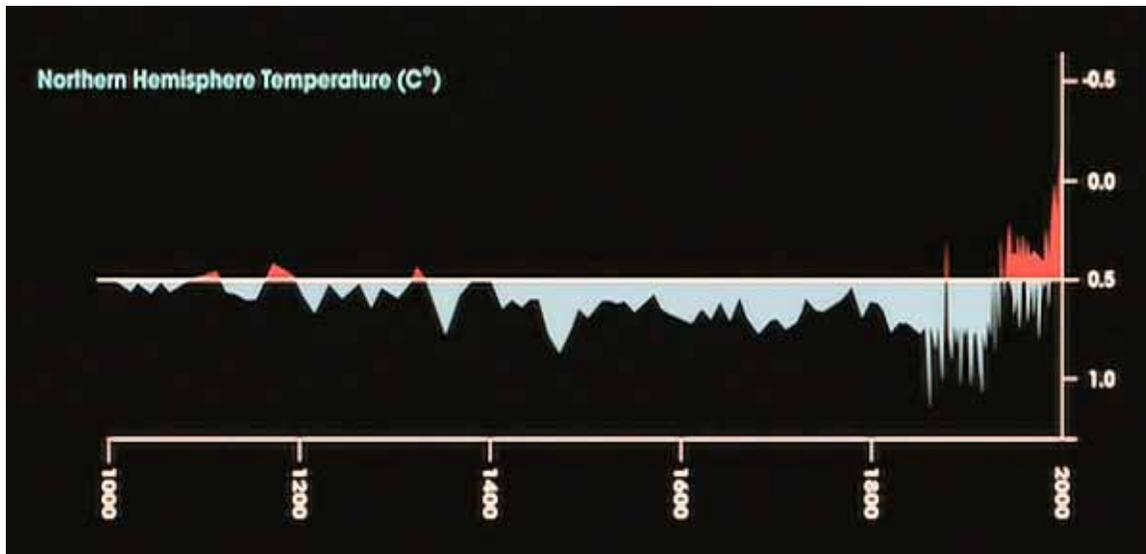


Figure 1

Dataset Differences

If you look at the right portion of Figure 1, you will see that the nature of the data changes. Up until 1850 or so, the data fluctuates in a relatively smooth manner with more rounded humps and troughs. However, after 1850 or so, the data becomes much more “spiky”. While this doesn’t necessarily mean anything significant, it means that there is some significant difference between the Pre-1850 and the Post-1850 data. At a minimum, and given the relative importance of this slide, Al Gore should have done a better job explaining the source of the data on which this slide is based and the exact nature of the difference between the two data sets.

Baseline And Centerline Manipulation

One way to make your case stronger, even if it is fundamentally weak, is to manipulate the baseline and/or the centerline of the diagrams that you use.

One way to do this is to set the baseline or centerline value at something other than zero. For example, if you are tracking the progress of a stock that ranges in value over time from \$90 per share to \$100 per share, you can magnify the apparent fluctuation of the stock by setting the baseline at \$90 per share rather than at \$0 per share. That will make the stock seem to be more volatile than it actually is.

A second way to do this is to manipulate the timeframe that is represented. For example, if you wanted to pump a stock that had just collapsed, then the way to make it look good would

be to start to timeframe the day after the stock collapsed. That way, the drop wouldn't be apparent. Instead, the stock would only be trending upwards (since after collapsing often the only way a stock has to go is up).

In Figure 1, Al Gore employs both of these tricks.

First, by setting the time baseline of Figure 1 at 1000 years, Al Gore has magnified the visual impact of the “hockey stick”. As you can see in Figure 2, if you take a 2000-year view of temperatures, you will see that temperatures 1000 years ago were higher than they have been in the past 2000 years (the past 100 years excluded) due to the existence of the Medieval Warm Period.³

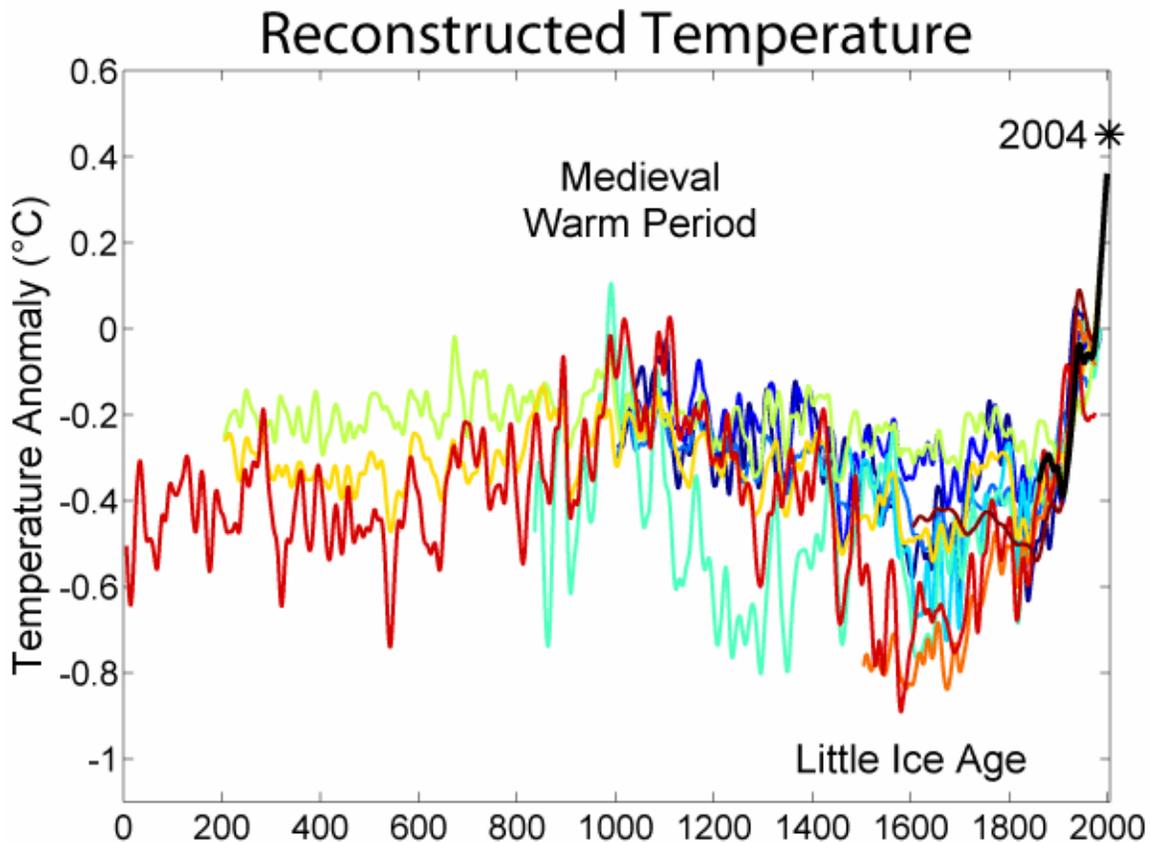


Figure 2

Second, by setting the centerline of Figure 1 at -0.5 degrees Celsius (rather than the more typical and conventional 0.0 Celsius), Al Gore gives the impression that temperatures since 1920 (or so) have moved to unprecedented levels when in truth they appear to have only started to return to their average value.⁴

Graphing Convention Changes

In Figure 1, up until 1920 (or so) the diagram follows the convention of only plotting one data point per unit of time. In other words, for a given year, the point that is plotted is either above, at, or below the horizontal centerline. As a result, up to 1920 (or so), you have a solid line that fluctuates above and below the horizontal centerline.

However, after 1920 (or so), and for reasons that are not explained, the convention that is used changes. Now we have two values plotted for a given point in time. Notice how in Figure 3, after 1920 or so, there are frequently both red and blue lines for a given point in time. This suggests that the data that is being represented is a range rather than a point value.

More importantly, it also makes it impossible to determine the actual average Northern Hemisphere temperature value since 1920. Is it the lower blue value or the higher red value?

Unfortunately, why the graph does this isn't explained anywhere.

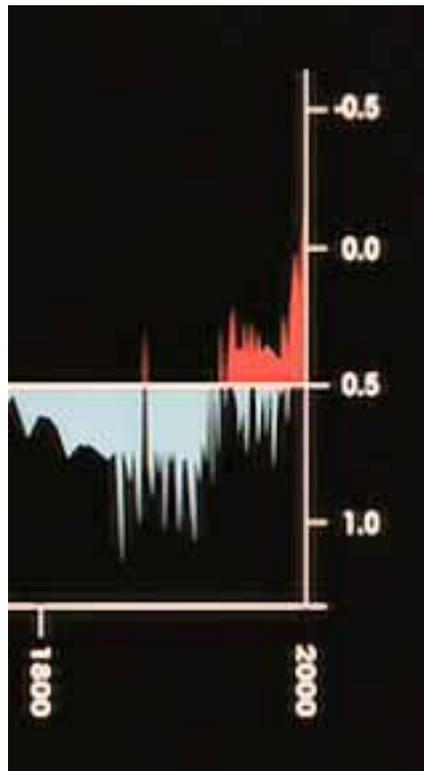


Figure 3

This also doesn't make intuitive sense. If anything, you would expect recent values to be point values (since they could be directly and accurately measured) and historical values to be range values (since they could only be estimated).

There's something funny going on here.

CONCLUDING THOUGHTS

Does all of this mean that Al Gore is a liar and that global warming is a myth?

Not necessarily.

However, it does mean that Al Gore -- or whoever prepared this chart for him -- used a number of tricks to make his case more persuasive. He used those tricks to try to make the data better fit his understanding and explanation of what's going on in the world.

Whether he did this intentionally or not is beside the point. When you are dealing with an issue that could have an economic impact measured in the billions or even trillions of dollars, he should have been more careful when making his case.

We deserve better.

ABOUT THE AUTHOR

Chris O'Leary is a consultant in the field of user interface design and information design (among other things). He helps companies enhance their revenues by improving the usability of their web sites and other communication pieces. He is currently in the process of publishing a book called Elevator Pitch Essentials, which explains the secrets of creating an effective elevator pitch.

In his free time, Chris O'Leary is working to drive down the rate of elbow and shoulder injuries in baseball pitchers at both the youth and major league levels.

To find out more about Chris O'Leary, visit his web site at www.chrisoleary.com

¹ I also thought the comparison of Temperature Levels to CO2 Concentration Levels on page 66 was interesting, but you have to remember that correlation doesn't imply causation. Also, if you look at the graph closely, you will see that Temperature Levels appear to lead, rather than lag behind, CO2 Concentration Levels which is not what you would expect to see if CO2 Concentration Levels were driving global temperatures.

² See for example the chapter entitled "Graphical Integrity" on pages 53-77 of Edward Tufte's book "The Visual Display Of Quantitative Information".

³ SOURCE: http://en.wikipedia.org/wiki/Image:2000_Year_Temperature_Comparison.png

⁴ Of course, you can change the centerline value of a graph by changing the timeframe. The average value will change depending on how much, or how little, time is included in the graph. However, Al Gore doesn't seem have a problem with the accepted average Northern Hemisphere temperature. If he did, he would have recalculated it. Instead, he accepts it as given but still drops his centerline value to -.5 degrees Celsius.