

## SATELLITE AND BALLOON MEASUREMENTS vs SURFACE DATA

Ever since John Christy and Roy Spencer (University of Alabama, Huntsville) developed their remote sensing approach of measurements of temperature and other properties of the troposphere in the early 1990s, there has been a discrepancy with data derived from surface measurements.

Christy and Spencer never found the rapid rise in temperatures that were forecast by the IPCC's computer simulation models, nor by the traditional data from ground stations as reported by the IPCC researchers (Phil Jones and others). The C&S data have measured a temperature increase rate since 1979 of 0.09°C/decade, while the ground stations average 0.20° C/decade for the same period.

Consequently, the Christy and Spencer data have always been a bothersome fact to the Global Warming crowd.

We are actually dealing with two aspects here:

- \* First, to the critics of the rapid warming scenario, the *increases* reported by the IPCC researchers are largely due to inadequate correction for the very uneven distribution of observation stations (Lack of rural, deserts, ocean stations) and the great changes in land use in developed and developing areas (Urban Heat Island Effect). In addition the adjustments made to raw measured surface data have been criticised for increasing any warming trends by Robert Balling Jr. and Craig Idso (Geoph.Res.Letters, 2002, Vol.29).
- \* Second, the lower *levels* of the numbers coming out of the troposphere have been questioned on the basis of various corrections supposedly being improperly applied.

The latter is the subject of three recent papers in *Science* magazine by Mears & Wentz, Sherwood, Lazante & Meyer, and Santer *et al* (doi. 10.1126/Science.1114772, 1115640 and 48670 respectively and online on [www.scienceexpress.org](http://www.scienceexpress.org)). The writers come to the conclusion that, applying the 'proper' corrections to various aspects of satellite orbit decay and sensor frequency response, the Christy and Spencer data would now be close to agreement with the IPCC's computer projections.

The reaction to this has been swift:

\* **Dr. John Christy** has said (personal comment) in reaction to Santer's statement in 'USA Today' that Santer is using a different data set, not the corrected satellite set, nor the fully corrected balloon data set and that all differences found are all within the 0.05<sup>0</sup> C/decade range.

\* **Dr. Roy Spencer**, in an article in Tech Central Station of August 11<sup>th</sup> reports that diurnal and other corrections presently being worked on by his team have produced a slightly higher rate of 0.12°C/decade, still well below the surface data range, but in agreement with corrected balloon data. He is also sceptical of Sherwood's new calibration methods affecting the balloon-based radiosonde data.

We at *Friends of Science* try to take a bit more disengaged view of matters.

In the first place we are cognisant of the fact that in these physical measurements so many adjustments have to be made for things like orbital decay of satellites, calibrations and time adjustments of various kinds that the end-result may have resulted in adjustments that have enlarged the cumulative margin of error to the point that it makes the fractions of degrees Celsius seem unimportant. Compare that against the Global Temperatures calculated from ground stations with their above mentioned obvious problems and unresolved criticisms and one questions the relevance of it all.

What are we measuring anyway? The Global average, or maybe the global mean temperature? There is no such thing.

We asked the members of our Scientific Advisory Board for their reaction. Here are some quotes from their responses:

**\* Dr. Chris deFreitas, Auckland NZ:**

“Global climate may or may not be changing about a tenth of a degree Celsius per decade. The quality of the data we currently have simply is not good enough to tell whether the digit for first decimal place is zero, 1 or 2, let alone what the second decimal place should be and whether we are confident it is correct.”

**\* Dr. S.(Tad) Murty, Ottawa ON:**

“Like many others, I have a fundamental issue even with the concept of a global mean temperature, let alone how it is varying. As you know, there is nothing like an annual global mean temperature. It is not a physical entity that actually exists. It is simply a matter of definition, or rather it is statistic artificially concocted, by averaging a set of observations. Since the averaging over different space and time scales can be done in several different ways, it looks to me that, at least in a mathematical sense, it is an ill-posed problem. There cannot be a unique solution, or rather various solutions will not converge towards one unique value.”

**\* Dr. Madhav Khandekar, Unionville ON:**

“...It is .... important ..... to analyze the practical aspects of these temperature changes and whether in a science like weather & climate, is it all that critical to determine temperature changes to the accuracy of two decimal places and "claim" a global warming signal as is now being done by Tim Barnett and others while documenting "warming of the oceans" and insisting that all this ( tiny) warming is solely due to GHGs.”

**\* Dr. Timothy Ball, Victoria, BC:**

“The correction does bring the trend into the lower end of the IPCC estimate as you indicate. So what! Nobody is arguing that warming hasn't occurred since 1680 as you have heard me say many times, or that a small warming trend is now occurring. The point is this warming trend is well within any previous natural warming trend and definitely not

due to CO<sub>2</sub> or even the human portion of CO<sub>2</sub> in the atmosphere. I have much greater concern about the accuracy of the temperature trend of the last 130 years as calculated by Jones. He also refuses to release his data and methods yet his graph and data are the sole basis of the computer models. As I have pointed out before, one year two sets of numbers for the global average annual temperature were released, one British and one American. They differed by 0.5°C, which is the total amount of increase claimed by Jones in his 130 year record.”

The growing evidence that the simplistic *ceteris paribus* hypothesis that an increase in CO<sub>2</sub> due to human contributions will result in global warming is scientifically unsupported, has led to an increasing stridency and desperation in the proponents and defenders of the hypothesis.

Finally, **Roy Spencer** takes the measure of this concerted attack on his and John Christy’s work:

“I only hope that the appearance of these three papers together, with considerable overlapping of authorship, does not represent an attempt to make measurements fit theoretical models. For when this happens, actual measurements can no longer fulfill their critical role in independent validation of climate models. Ideally, measurements would be analyzed with no knowledge of what any given theory predicts they should be.

What will all of this mean for the global warming debate? Probably less than the media spin will make of it. At a minimum, the new reports show that it is indeed possible to analyze different temperature datasets in such a way that they agree with current global warming theory. Nevertheless, all measurements systems have errors (especially for climate trends), and researchers differ in their views of what kinds of errors exist, and how they should be corrected. As pointed out by Santer et al., it is with great difficulty that our present weather measurement systems (thermometers, weather balloons, and satellites) are forced to measure miniscule climate trends. What isn’t generally recognized is that the satellite-thermometer difference that has sparked debate in recent years has largely originated over the tropical oceans -- the trends over northern hemispheric land areas, where most people live, have been almost identical.”