

Gray, V R. *The Cause of Global Warming* Energy & Environment 11 (6), 613-629 2001

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A member of the audience at the lecture, Dr Keith Lassey from NIWA wrote to the Chairman, George Jones asking him who had paid for my lecture, and he suggested that such lectures should not be permitted. I replied by stating that I had retired and was living on a pension, partly paid by the New Zealand Government.

I have been prevented from giving a lecture to the Royal Society Branch on climate ever since.

My lecture, and the paper that was published, examined the so-called "Mean Annual Global Surface Temperature Anomaly Record" (MAGSAR), the latest CRU version of which is attached. Many people seem convinced that this chart, and the others similar to it, are evidence that global surface temperatures have risen over the last 150 years. My lecture showed that the claimed "global warming" could be explained far more plausibly by a large number of factors and circumstances relating to the manner in which the charts have been compiled.

The original lecture and paper can now be updated to include many more reasons why the MAGSAR is not reliable evidence for global warming.

The theory that additional carbon dioxide emissions in the atmosphere are causing a warming of the earth's surface ran into an impenetrable road block from the start because there is no method currently available that can measure the average surface temperature of the earth's surface. It is thus impossible to find out if it is increasing.

The global warming enthusiasts therefore welcomed the proposal put before the US Congress by James Hansen on June 23rd 1988 to make use of temperature measurements made at weather stations throughout the world. This method violated many established scientific and statistical principles but this is ignored.

The method did not aim to measure global temperature at all, but only "anomalies" from an "average" taken from a miscellaneous and constantly changing set of temperature data from meteorological weather stations. The world was divided into latitude/longitude boxes, then the "daily mean temperature" from all acceptable weather stations in each box was averaged, and these averages were averaged further, daily, monthly and then annually and the result subtracted from the averages of all of them for a "reference period" to give the "anomalies" which are the basis of the attached plot. Each of these processes had large inaccuracies which escalated in the final figure but which are not mentioned.

Weather stations have been set up to monitor local weather in to help local residents, agriculture and shipping in their daily lives, not to sample global climate. Their

measurements are therefore unsuitable for this purpose. As Hansen himself has stated persistently on his website, there is no logical or scientific way of defining local surface temperature or how or when it should be measured.

Weather forecasters have always had to compete with fortune tellers, soothsayers and people who claim superiority over the use of scientific methods. My Newsletter No 228 describes how the erstwhile captain of the "Beagle" and Governor of New Zealand, Admiral Robert Fitzroy, first Head of the UK Met Office, fought to establish the use of science against the previous necromancy. Contemporary meteorologists still have this same task.

Weather stations are not situated randomly over land surfaces. They have mainly been in centres of population and in ports, It may be argued that "anomalies" of even such a poor sample may represent what is happening globally, until it is realised that the sample is constantly changing, both in numbers and location.

In 1910 there were 1500 weather stations, mostly in the Northern Hemisphere, and there were none in Antarctica, Greenland, the interior of Africa, South America, or Australia and most of Eastern Siberia. By 1970 there were 6000 stations over most parts of the land surface, dropping to 2500 by the year 2000. Much of the behaviour of the MAGSAR can be explained by these changes alone. The increase from 1901-1940 was due to industrialization in the major cities, and growth of roads and vehicles. After the second world war there was an increase in weather stations into rural and more elevated locations, as well as a shift to the early airports, so there was a fall in MAGSAR until 1976. After 1980 the numbers of stations began to fall, usually by removal from the more rural or more elevated, while airports became more industrialized. This change came to an end around 2000 so MAGSAR itself has changed little since then.

There is no quality control on weather stations. either nationally or internationally, and no standard procedure for any of their measurements. Each authority or nation decides what measurements to make in whatever way they choose.

For temperature, which is the basic measurement for the MAGSAR charts, some stations measure just one temperature per day, others measure the maximum and minimum temperature also once a day, but at no definite time. Others measure more frequently and recently some measure continuously. Since The earliest measurements were either a single value or a single measurement of maximum and minimum, the basic figure used for the MAGSAR is the "daily mean", the average of the maximum and minimum. This average is also automatically biased to an unknown degree compared with any other average. It is also unclear how single measurements could be incorporated in a global average.

There are two different climates in each place on earth, by day, when there may be sun, and by night, when there is no sun, a distinction ignored by computer modelists. Most people therefore would like to know whether the day will be warm and whether the night will be cold. The Max/min average is for a different twenty four hours

than the calendar day, so it introduces what the Americans call the "Time of Observation Bias" which they have tried to estimate for US weather stations, but it cannot even be estimated for most parts of the globe because there are insufficient stations.

There is no uniformity in the instruments used to measure temperature, The earlier ones used liquid in glass thermometers calibrated in Fahrenheit degrees, sometimes, but not always in tenths of a degree, The Max/Min figures were sometimes from a thermometer that measured both and sometimes from separate ones. Temperate countries used mercury in glass, but very cold countries had to use alcohol in glass. More recently, various forms of thermistor were used, and most recently with continuous recording.

The shelter holding the instruments and its location are not uniform. I was surprised to read that there are two different kinds of shelter in the United States, and there are still some sites there on top of buildings

It seems to be insufficiently appreciated, even by some meteorologists that glass is a cooled liquid that continually shrinks. All liquid-in-glass thermometers therefore begin to read high unless they are regularly re-calibrated. Improved meteorological glass has been developed but has not removed this necessity. Anthony Watts showed that changing the paint on the thermometer screen from whitewash to latex paint gave an upwards bias of nearly half a degree C.

Who makes the measurements? It is not possible for any authority to control the numbers of staff needed. US observers are "volunteers". Russian readings used to be made by slaves in the Gulags who had rations and fuel allocated on the basis of the local temperature. Later on, in the 80s, the Russian observers were not paid. One might imagine that on a very cold winter's day there would be reluctance to get out of bed to read a thermometer.

Then there are a large gaps in all records .

Anthony Watts, who organized volunteers to audit US weather stations, has found that 70% are incapable of measuring temperature to an accuracy better than 2°C. It is highly likely that the rest of the world today and all the earlier measurements would be less accurate than this. It does not matter for weather forecasting where decimals of a degree are never used, and where an odd degree out does not matter, but it does mean that any "trend" in The Mean Annual Global Surface Temperature Anomaly Record, or any local record, is meaningless unless it shows a large change of the order of several degrees a century.

The Climategate computer file showed that original records are now lost and that the MAGSAR is currently manipulated to supply the requisite "upwards trend":

This discussion applies only to weather station measurements over land surfaces, covering only a small part of 29% of the earth's surface. There are many sea surface measurements from ships that are even less reliable than the land measurements. At least

the land measurements are often in the same place and by the same people. Jim Hansen who first proposed the "anomaly" method, and his US colleague Tom Karl, have always argued that the sea surface measurements are unsuitable for incorporation into a "global" anomaly record; to this very day. However, the Climate Research Unit of the University of East Anglia has incorporated sea surface measurements to give a supposedly "global" chart (attached), which, surprisingly, is not all that different from their land-based chart.

It might be noted that there are not even sea surface measurements for the Arctic, since the Arctic ocean is usually covered in ice. It also escapes the satellite measurements as well

The most reliable evidence on long-term surface temperature change is from the few relatively unchanged long term weather stations. They all show that surface temperature change over the last century has been negligible. Several examples are shown in the original paper and recent updates have all confirmed that there has been no overall "global warming" at all, merely irregular fluctuations in response to well recognised natural influences such as changes in the sun and in ocean oscillations.