

Errors in the Measurement of Global Warming Corrected

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New Haven, Conn. — The effect of the sun’s heat on weather balloons largely accounts for a data discrepancy that has long contributed to a dispute over the existence of global warming, according to a report by scientists at Yale University and the National Oceanic and Atmospheric Administration (NOAA).

The report, to be published in the journal *Science*, says that direct heat of the sun on temperature probes of the weather balloon (radiosonde) probably explains the discrepancy between reports showing that atmospheric temperatures have been unchanged since the 1970’s, while temperatures at the Earth’s surface are rising.

For the last 40 years radiosonde temperature information has been collected twice each day from stations around the world at local times that correspond to 00:00 and 12:00 Greenwich Mean Time. Some measurements were taken in daylight, others in darkness.

“Even though models predict a close link between atmospheric and surface temperatures, there has been a large difference in the actual measurements,” said Steven C. Sherwood, associate professor of geology and geophysics at Yale, and lead author. “This has muddied the interpretation of reported warming.” Most scientists have concluded the surface warming has partly resulted from a buildup of greenhouse gases in the atmosphere.

The key to the error in climate change estimates lay in instrument

design, according to this study. With exposed sensors, measurement taken in daylight read too warm, and while solar heating had a measurable impact on the earlier designs, the effect became negligible in more recent designs.

“It’s like being outside on a hot day — it feels hotter when you are standing in the direct sun than when you are standing in the shade,” said Sherwood. “We can’t hang our hats on the old balloon numbers.”

After taking this problem into account, the researchers estimate there has been an increase of 0.2 degree Celsius ($^{\circ}\text{C}$) in the average global temperature per decade for the last thirty years. Over the next century, global surface temperatures are expected to increase by 2 to 4 $^{\circ}\text{C}$. However, year-to-year and region to region increases may vary considerably, with a smaller increase in the tropics but 10 degrees or more possible in some Polar Regions.

“Unfortunately, the warming is in an accelerating trend — the climate has not yet caught up with what we’ve already put into the atmosphere,” said Sherwood. “There are steps we should take, but it seems that shaking people out of complacency will take a strong incentive.”

Co-authors on the paper were Cathryn Meyer at Yale and John Lanzante at the NOAA/ Geophysical Fluid Dynamics Laboratory at Princeton. The research was funded by the NOAA Climate and Global Change Program and the National Science Foundation.

Source: Yale University

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