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COOLING THE WARMING DEBATE
Berkeley Earth Releases Global Land Warming Analysis

Global warming is real, according to a major study released today. Despite issues raised by climate change skeptics, the Berkeley Earth Surface Temperature study finds reliable evidence of a rise in the average world land temperature of approximately 1°C since the mid-1950s.

Analyzing temperature data from 15 sources, in some cases going as far back as 1800, the Berkeley Earth study directly addressed scientific concerns raised by skeptics, including the urban heat island effect, poor station quality, and the risk of data selection bias.

On the basis of its analysis, according to Berkeley Earth's founder and scientific director, Professor Richard A. Muller, the group concluded that earlier studies based on more limited data by teams in the United States and Britain had accurately estimated the extent of land surface warming.

"Our biggest surprise was that the new results agreed so closely with the warming values published previously by other teams in the U.S. and the U.K.," Muller said. "This confirms that these studies were done carefully and that potential biases identified by climate change skeptics did not seriously affect their conclusions."

Previous studies, carried out by NOAA, NASA, and the Hadley Center, also found that land warming was approximately 1°C since the mid-1950s, and that the urban heat island effect and poor station quality did not bias the results. But their findings were criticized by skeptics who worried that they relied on ad-hoc techniques that meant that the findings could not be duplicated. Robert Rohde, lead scientist for Berkeley Earth, noted that "the Berkeley Earth analysis is the first study to address the issue of data selection bias, by using nearly all of the available data, which includes about 5 times as many station locations as were reviewed by prior groups."

Elizabeth Muller, co-founder and Executive Director of Berkeley Earth, said she hopes the Berkeley Earth findings will help "cool the debate over global warming by addressing many of the valid concerns of the skeptics in a clear and rigorous way." This will be especially important in the run-up to the COP 17 meeting in Durban, South Africa, later this year, where participants will discuss targets for reducing Greenhouse Gas (GHG) emissions for the next commitment period as well as issues such as financing, technology transfer and cooperative action.

The Berkeley Earth team includes physicists, climatologists, and statisticians from California, Oregon, and Georgia. Rohde led the development of a new statistical approach and what Richard Muller called "the Herculean labor" of merging the data sets. One member of the group, Saul Perlmutter, was recently announced as a winner of the 2011 Nobel Prize in Physics (for his work in cosmology).

The Berkeley Earth study did not assess temperature changes in the oceans, which according to the Intergovernmental Panel on Climate Change (IPCC) have not warmed as much as land. When averaged in, they

reduce the global surface temperature rise over the past 50 years -— the period during which the human effect on temperatures is discernable -- to about two thirds of one degree Centigrade.

Specifically, the Berkeley Earth study concludes that:

- The urban heat island effect is locally large and real, but does not contribute significantly to the average land temperature rise. That's because the urban regions of the Earth amount to less than 1% of the land area.

- About 1/3 of temperature sites around the world reported global cooling over the past 70 years (including much of the United States and northern Europe). But 2/3 of the sites show warming. Individual temperature histories reported from a single location are frequently noisy and/or unreliable, and it is always necessary to compare and combine many records to understand the true pattern of global warming.

  "The large number of sites reporting cooling might help explain some of the skepticism of global warming," Rohde commented. "Global warming is too slow for humans to feel directly, and if your local weather man tells you that temperatures are the same or cooler than they were a hundred years ago it is easy to believe him." In fact, it is very hard to measure weather consistently over decades and centuries, and the presence of sites reporting cooling is a symptom of the noise and local variations that can creep in. A good determination of the rise in global land temperatures can't be done with just a few stations: it takes hundreds – or better, thousands – of stations to detect and measure the average warming. Only when many nearby thermometers reproduce the same patterns can we know that the measurements were reliably made.

- Stations ranked as "poor" in a survey by Anthony Watts and his team of the most important temperature recording stations in the U.S., (known as the USHCN -- the US Historical Climatology Network), showed the same pattern of global warming as stations ranked "OK". Absolute temperatures of poor stations may be higher and less accurate, but the overall global warming trend is the same, and the Berkeley Earth analysis concludes that there is not any undue bias from including poor stations in the survey.

Four scientific papers setting out these conclusions have been submitted for peer review and will form part of the literature for the next IPCC report on Climate Change. They can be accessed on: www.BerkeleyEarth.org. A video animation graphically shows global warming around the world since 1800.

Berkeley Earth is making its preliminary results public, together with its programs and dataset, in order to invite additional scrutiny. Elizabeth Muller said that "one of our goals is to make the science behind global warming readily accessible to the public." Most of the data were previously available on public websites, but in so many different locations and different formats that most people could access only a small subset of the data. The merged database, which combines 1.6 billion records, is now accessible from the Berkeley Earth website: www.BerkeleyEarth.org .

What Berkeley Earth has not done is make an independent assessment of how much of the observed warming is due to human actions, Richard Muller acknowledged. As a next step, Berkeley Earth plans to address the total warming of the oceans, with a view to obtaining a more accurate figure for the total amount of global warming observable.

More information about Berkeley Earth is available at www.BerkeleyEarth.org.

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