



[Latest News](#)

[Browse Topics](#)

[Encyclopedia](#)

[Health Center](#)

[Videos](#)

[Health & Medicine](#)

[Mind & Brain](#)

[Plants & Animals](#)

[Space & Time](#)

[Earth & Climate](#)

[Matter & Energy](#)

Show **menu** | [ScienceDaily home page](#) | [RSS feeds](#) | [Free newsletter](#) | [Print this page](#) | [Email to friend](#) | [Bookmarks](#)

Source: [University of Copenhagen](#)  
Date: March 18, 2007

More on: [Climate, Global Warming, Environmental Issues, Geography, Math Puzzles, Computer Modeling](#)

## Researchers Question Validity Of A 'Global Temperature'

*Science Daily* — Discussions on global warming often refer to 'global temperature.' Yet the concept is thermodynamically as well as mathematically an impossibility, says Bjarne Andresen, a professor at The Niels Bohr Institute, University of Copenhagen, who has analyzed this topic in collaboration with professors Christopher Essex from University of Western Ontario and Ross McKittrick from University of Guelph, Canada.

It is generally assumed that the atmosphere and the oceans have grown warmer during the recent 50 years. The reason for this point of view is an upward trend in the curve of

Ads by Google [Advertise on this site](#)

**Global Warming: The Truth**  
Hard truths for both left and right And the story taken way past 2100  
[www.irawrites.com](http://www.irawrites.com)

**How 2 Stop Global Warming**  
Take Senator Barbara Boxer's survey Prioritize global warming solutions  
[ga4.org/pacforachange/gw\\_agenda.htm](http://ga4.org/pacforachange/gw_agenda.htm)

**Sea Surface Temp Charts**  
interactive and updated daily for the Northeast offshore fisherman!  
[www.sstol.com](http://www.sstol.com)

**Amazing Health Juice**  
May Prevent Cancer, Diabetes May Also Cure 40 Other Ailments!  
[www.meetmybiz.net/?ref=Jamie](http://www.meetmybiz.net/?ref=Jamie)

**Pancreatic Cancer?**  
Learn How Neulasta Can Help Support Your Body's Natural Defenses.  
[www.neulasta.com](http://www.neulasta.com)

## Science Video News



### Sports Injury Prevention Performance

A new computer-based sy gives physical therapists r time, objective measures c

motion of each joint in the patient's body. The system ... > [watch video](#)

Jump to: ... select topic:  < [prev](#) |

## For Health Care Professio

Free access to The 5-Minute Clinical Consult



[Wyeth.com](http://Wyeth.com)

SunCom WIRELESS  
**SWITCH AND SAVE**  
Save up to \$50! No rebates required.  
Score a phone  
\*New 2-yr contract and new activation requ

measurements of the so-called 'global temperature'. This is the temperature obtained by collecting measurements of air temperatures at a large number of measuring stations around the Globe, weighing them according to the area they represent, and then calculating the yearly average according to the usual method of adding all values and dividing by the number of points.

### Average without meaning

"It is impossible to talk about a single temperature for something as complicated as the climate of Earth", Bjarne Andresen says, an expert of thermodynamics. "A temperature can be defined only for a homogeneous system. Furthermore, the climate is not governed by a single temperature. Rather, differences of temperatures drive the processes and create the storms, sea currents, thunder, etc. which make up the climate".

He explains that while it is possible to treat temperature statistically locally, it is meaningless to talk about a global temperature for Earth. The Globe consists of a huge number of components which one cannot just add up and average. That would correspond to calculating the average phone number in the phone book. That is meaningless. Or talking about economics, it does make sense to compare the currency exchange rate of two countries, whereas there is no point in talking about an average 'global exchange rate'.

If temperature decreases at one point and it increases at another, the average will remain the same as before, but it will give rise to an entirely different thermodynamics and thus a different climate. If, for example, it is 10 degrees at one point and 40 degrees at another, the average is 25 degrees. But if instead there is 25 degrees both places, the average is still 25 degrees. These two cases would give rise to two entirely different types of climate, because in the former case one would have pressure differences and strong winds, while in the latter there would be no wind.

### Many averages

A further problem with the extensive use of 'the global temperature' is that there are many ways of calculating average temperatures.

Example 1: Take two equally large glasses of water. The water in one glass is 0 degrees, in the other it is 100 degrees. Adding these two numbers and dividing by two yields an average temperature of 50 degrees. That is called the arithmetic average.

Example 2: Take the same two glasses of water at 0 degrees and 100 degrees, respectively. Now multiply those two numbers and take the square root, and you will arrive at an average temperature of 46 degrees. This is called the geometric average. (The calculation is done in degrees Kelvin which are then converted back to degrees Celsius.)

The difference of 4 degrees is the energy which drives all the thermodynamic processes which create storms, thunder, sea currents, etc.

### Claims of disaster?

These are but two examples of ways to calculate averages. They are all equally correct, but one needs a solid physical reason to choose one above another. Depending on the averaging method used, the same set of measured data can simultaneously show an upward trend and a downward trend in average temperature. Thus claims of disaster may be a consequence of which averaging method has been used, the researchers point out.

### Related News Sections

- [Earth & Climate](#)
- [Computers & Math](#)

### Related News Topics

- [Climate](#)
- [Global Warming](#)
- [Environmental Issues](#)
- [Geography](#)
- [Math Puzzles](#)
- [Computer Mode](#)

### Related Science Stories

- [Climate Change: Could It Be Random?](#)
- [Climate Changes Are Linked Between Greenland And The Antarctic](#)
- [More Fires, Droughts And Floods Predicted](#)
- [Modest Climate Change Could Lead To Substantially More And Larger Fires](#)
- [Global Warming Means More Snow For Great Lakes Region](#)

### Related Encyclopedia Articles

- [Instrumental temperature record](#)
- [Consensus of scientists regarding global warming](#)
- [Climate model](#)
- [Temperature record](#)
- [Geologic temperature record](#)
- [Climate](#)
- [Attribution of recent climate change](#)
- [Greenland ice sheet](#)
- [Global climate record](#)
- [Gulf Stream](#)

### Related Book Reviews

- [Research Methods: A Process of Inquiry with Student Tutorial CD-ROM, Fifth Edition](#)
- [Field Notes from a Catastrophe](#)
- [Taking Charge of Your Fertility: The Definitive Guide to Natural Birth Control, Pregnancy Achievement, and Reproductive Health \(Revised Edition\)](#)
- [High Noon 20 Global Problems, 20 Years Solve Them](#)
- [Human Side of Organizations, The \(9th Edition\)](#)

What Bjarne Andresen and his coworkers emphasize is that physical arguments are needed to decide whether one averaging method or another is needed to calculate an average which is relevant to describe the state of Earth.

Reference: C. Essex, R. McKittrick, B. Andresen: Does a Global Temperature Exist?; J. Non-Equil. Thermodyn. vol. 32, p. 1-27 (2007).

*Note: This story has been adapted from a news release issued by University of Copenhagen.*

Ads by Google

[Advertise on this site](#)

---

<b>Prostate cancer</b>	<b>Prostate Cancer</b>	<b>Prostate Treatments</b>
Alternative Treatment Options With Proven Long Term Remission <a href="http://www.lssels.com">www.lssels.com</a>	Learn about different treatment options. Get more info online now. <a href="http://www.trelstar.com">www.trelstar.com</a>	All the Prostate Treatment Services For Prostate Treatments Start Here. <a href="http://Prostate.AlltheServices.com">Prostate.AlltheServices.com</a>

---

New! Search [Science Daily](#) or the entire web with Google:



Web  ScienceDaily.com

**Copyright © 1995-2007 ScienceDaily LLC — All rights reserved — Contact: [editor@sciencedaily.com](mailto:editor@sciencedaily.com)  
[About This Site](#) | [Editorial Staff](#) | [Awards & Reviews](#) | [Contribute News](#) | [Advertise With Us](#) | [Privacy](#)**