

# Global Warming vs. Climate Change

**Somchai Bovornkitti\***

Over the past few decades, the term “global warming” had become a popular by-word virtually everywhere, especially after NASA scientist James E. Hansen<sup>(1)</sup> testified to Congress in June 1988 about climate, specifically referring to global warming. In the meantime, several new terms emerged, e.g., “global climate change” and “global climate disruption,” but one particular term “climate change” strongly competed with the older term for prominence. Most importantly, the Intergovernmental Panel on Climate Change (IPCC), founded by the United Nations Environment Programme and the World Meteorological Organization, released climate change reports in 1992 and 1996, and most recently in 2001.<sup>(2)</sup> Are the terms interchangeable or do they convey different meanings? There are several reasons for preferring one term over the other, and these are elaborated as follows:

The present author is not absolutely certain whether the term “global warming” was coined by the Nobel Laureate Swedish scientist Svante Arrhenius<sup>(3)</sup> (Fig. 1) perhaps as early as before 1900,<sup>(4,5)</sup> as cited by S.M. Enzler,<sup>(2)</sup> or the more recent catchphrase mentioned in the November 6, 1957 issue of *The Hammond Times*<sup>(6)</sup> (Fig. 2) or by the geochemist

Wallace Broecker of Columbia University’s Lamont-Doherty Geological Observatory in 1975.<sup>(7)</sup> To the writer’s knowledge, Orawan Siriratpiriya, a renowned environmentalist at Chulalongkorn University, should be credited for her initial use in Thailand of the term “global warming” in a 1992 publication.<sup>(8)</sup>

For simplicity sake, “global warming” and “climate change” are just words with exact literal implications and inherent meanings. Although many people use the terms interchangeably as if they had the same



**Fig. 1** Svante Arrhenius<sup>(3)</sup>

\*The Academy of Science, the Royal Institute, Bangkok



Fig. 2 *The Hammond Times*<sup>(6)</sup>

meaning, this is not correct. Their meanings are different. In current use, “global warming” refers to the phenomenon of the increased average temperature of the Earth’s near-surface air and ocean since the mid-20<sup>th</sup> century and its projected continuation in accord with the first theory of global warming postulated in 1824 by the French mathematician Jean Baptiste Joseph Fourier,<sup>(9)</sup> whereas the term “climate change,” which was most likely introduced by Jule Charney of the Massachusetts Institute of Technology during the first National Academy of Science

study of carbon dioxide’s impact on climate, published in 1979.<sup>(10)</sup> Charney used the term “global warming” when referring to temperature change; when discussing other changes that would be induced by increasing levels of carbon dioxide, he used the term “climate change” (later to be strongly backed by IPCC<sup>(2)</sup>). By current definition, the term “climate change” encompasses – beyond withering weather – changes in regional climate characteristics, including temperature, humidity, rainfall, wind, and severe weather events.<sup>(11)</sup>

Notwithstanding the differences between “global warming” and “climate change,” the two are closely intertwined in determining the climate futures for the world. There are some regions that will get some benefits, but most of the predicted effects around the world are so bad that the problem of greenhouse gas emissions must be quickly fixed.

**Erik Conway<sup>(12)</sup> gave concisely concluded that** “We don’t use global warming. We use the less appealing “climate change”. Why?”:

- To a scientist, global warming describes the average global surface temperature increases resulting from human emissions of greenhouse gases, as first used in 1975.

- In the first National Academy of Science study of carbon dioxide’s impact on climate, published in 1979, Charney used the term “global warming” when referring to surface temperature increases; when discussing the many other changes that would be induced by increasing carbon dioxide, he used “climate change.”

- Global warming became the dominant popular term in June 1988, when NASA scientist Hansen testified to Congress about climate, specifically referring to global warming. Hansen’s testimony was very



widely reported in the popular and business media, and after that, use of the term global warming exploded.

- Temperature change itself is not the most severe effect of a changing climate. Changes to precipitation patterns and a rising sea level are likely to have much greater human impact than higher temperature alone. Thus, “**global climate change**” is the more scientifically accurate term.

***To the present author’s understanding, it may be concluded that:***

- Emission of greenhouse gases as a result of human activity causes global surface temperature increases (global warming).
- Global warming, the “cause,” perpetuates climate change, the “effect.”
- Climate change engenders natural disasters and other adverse consequences.

**References**

1. Erik Conway. Global warming vs climate change. From: [http://www.terraily.com/reports/Global\\_Warming\\_vs\\_Climate\\_Change\\_999.html](http://www.terraily.com/reports/Global_Warming_vs_Climate_Change_999.html). Retrieved Aug. 9, 2009.

2. Enzler SM. History of the greenhouse effect and global warming. From: [mhtml:http://65.55.68.103/att/GetAttachment.aspx?file=f6de7f9a-6a83-446a-a60b-8144eb...](http://65.55.68.103/att/GetAttachment.aspx?file=f6de7f9a-6a83-446a-a60b-8144eb...) Retrieved Aug. 18, 2009.

3. Image: Arrhenius.pdf. From: [http://www.globalwarmingart.com/wiki/Image:Arrhenius\\_pdf](http://www.globalwarmingart.com/wiki/Image:Arrhenius_pdf). Retrieved Aug. 9, 2009.

4. Svante Arrhenius. On the influence of carbonic acid in the air upon the temperature of the ground. Philosophical Magazine and Journal of Science (fifth series) 1966;41:237-75. From: [http://www.globalwarmingart.com/wiki/Image:Arrhenius\\_pdf](http://www.globalwarmingart.com/wiki/Image:Arrhenius_pdf). Retrieved Aug. 9, 2009.

5. Svante Arrhenius. Das Werden der Welten. Leizig: Academic Publishing House; 1908. From: [http://www.globalwarmingart.com/wiki/Image:Arrhenius\\_pdf](http://www.globalwarmingart.com/wiki/Image:Arrhenius_pdf). Retrieved Aug. 9, 2009.

6. Global Warming 1957. From: <http://firstmention.com/globalwarming.aspx>. Retrieved Sept. 28, 2009.

7. Wallace Broecker. Climate change: are we on the brink of a pronounced global warming? Science 1975;189:460-3. Available from: <http://www.sciencemag.org/cgi/content/abstract/189/4201/460>. Retrieved Sept. 28, 2009.

8. Siriratpiriya O. Warm earth. IPST J 1992;20:40-5.

9. History of global warming. From: <http://sn121w.snt121.mail.live.com/mail/InboxLight.aspx?FolderID=00000000-0000-0000-...> Retrieved Aug. 11, 2009.

10. Jule Charney. NASA - What’s in a Name: Global Warming vs. Climate Change. From: [http://www.nasa.gov/topics/earth/features/climate\\_by\\_any\\_other-name.html](http://www.nasa.gov/topics/earth/features/climate_by_any_other-name.html). Retrieved Aug. 9, 2009.

11. Global Warming vs. Climate Change --- A Knock-out in Round 1. From: <http://www.grinningplanet.com/2007/01-02/global-warming-vs-climate-change.htm>. Retrieved Aug. 9, 2009.

12. Conway E. NASA - what’s in a name? Global warming vs. climate change. From: [http://www.nasa.gov/topics/earth/features/climate\\_by\\_any\\_other\\_name.html](http://www.nasa.gov/topics/earth/features/climate_by_any_other_name.html). Retrieved Aug. 9, 2009.