

**Similarity between the Debate on Global Warming and on the Extinction of Dinosaurs:
A Clash between the View of Physicists and of Naturalists**
(shortened version)

Syun Akasofu

The present popular view about the extinction of dinosaurs is that the extinction was caused by the impact of a large meteorite on the Earth, which destroyed the environment suitable for dinosaurs. This view was proposed by a group of scientists, including physicists, who claimed that iridium was found in strata at many locations in the world, which was supposed to be formed at the time of the extinction of dinosaurs. A relatively large amount of iridium is a good indication of meteorite debris, although there are still many questions as to how the impact actually caused the extinction. It is my understanding that physicists are quite persuasive about the meteorite theory and they sometimes forget or ignore other geological facts. Many geophysicists are interested in meteorites and their impact craters, so they have naturally joined in supporting the meteorite scenario. They have conducted many simulation studies of meteorite impacts using supercomputers and laboratory models. Based on those studies, a number of animated TV programs were produced in which dinosaurs watched in horror as red clouds spread toward them from the horizon and engulfed them, killing them all almost instantly. Many geologists are not necessarily happy with such a scenario, because they have various pieces of geological (fossil) evidence that do not necessarily fit such a scenario. However, they tend to keep silent in the face of the overwhelming popular view.

The present popular view on global warming is that the manmade greenhouse effect of CO₂ is responsible. The International Panel on Climate Change (IPCC) scientists have been quite persuasive, concluding that their study proved their *hypothesis* of the greenhouse effect of CO₂, even publishing their “summary” for policy makers, in addition to a series of voluminous publications. The physics of the greenhouse effect by CO₂ is well established, so that many atmospheric physicists have naturally joined in supporting the greenhouse scenario by relying on results of Global Climate Model (GCM) modelers, although they themselves cannot estimate the extent of the warming. Scientists who understand the physics of the greenhouse effect of CO₂ tend to agree with them. A number of TV programs have been produced in which the warming Earth becomes reddish, giving the impression that the Earth will eventually become a fireball. Most TV programs on global warming use a scene in which large blocks of ice fall into a glacier lake or ocean from a glacier’s terminus, although this scene has nothing to do with global warming or the greenhouse effect; a glacier is a river of ice, thus gravity moves it downhill, causing the ice to calve no matter how warm or cold the air.

Many geophysicists, particularly those who have devoted their time to field observations and also have geology in their background, are not necessarily happy with such a scenario, because they know that natural phenomena are very complex and that the Earth has experienced numerous climatic changes in geologic time (before the appearance of human beings). However, they also tend to remain silent about the popular view.

Thus, there are two groups of scientists in each debate. In the global warming debate, one group has basically a physicists' point of view, a belief that the basic science that is related to global warming is well understood and that the issue can be understood in terms of a series of differential equations, which in turn can be solved by a supercomputer.

The other group has a genuine naturalist's point of view on natural phenomena, including climate change. They stand in awe of nature and believe that their understanding of nature is still too limited to claim that the present warming trend is caused only by the greenhouse effect of CO₂. They are humble and do not necessarily trust what a supercomputer generates.

Many scientists and the public in general consider that the 2007 IPCC Report put an end to the scientific debate. Thus, those who do not agree are categorized as skeptics, deniers, heretics, etc.; some have even been demonized by some greenhouse advocates who, in general, have little knowledge of their own on the science of global warming. The IPCC and the worldwide mass media claim that there is "consensus" among 2,500 expert scientists, from 130 countries. They emphasize that global warming is considered to be the most important problem that humankind faces today.

In spite of these sweeping conclusions, there is still an uneasy feeling and even deep-rooted opposition to the IPCC report among global warming researchers. The reason may be that debates about dinosaur extinctions and global warming are, in some sense, a sort of clash between the two different scientific cultures. Both groups are trained very differently, and their basic ways of approaching the same scientific problem are also quite different, as are basic tools.

A great disadvantage to the minority voices in both debates is that they are dealing with subjects of *unknown causes*, such as causes of the Big Ice Age, the Little Ice Age, the Medieval Warm Period, etc., although the IPCC scientists should be aware that a supercomputer is powerless for climate change of unknown causes. It is difficult, despite their research results for the second group, to convince other scientists and the public just by saying that the Earth's climate changes all the time; such statements about past fluctuations in climate tend to sound vague, unconvincing, and unpersuasive. Therefore, it is difficult for them to convince and persuade other scientists and the public of their research results. For these reasons, they tend to remain the "silent majority" or "silent minority." Further, the second group does not have the media propaganda machines on its side, since the results are not sensational enough and thus not newsworthy.

It is important to realize, however, in spite of their persuasive conclusion, that the IPCC has not given a specific percentage of global warming that is caused by the greenhouse effect of CO₂, although they claim that "most" of the global warming is caused by the manmade greenhouse effect of CO₂ (the 2007 IPCC Report, p. 10). I am not aware of any convincing publications in scientific journals, including in the voluminous IPCC Reports, on what their claim of "most" might be based. I believe that this is the weakest point made by the first group upon which they made their *quantitative* claim.

Under such a situation, as a first step, I have proposed that about 80 percent of the present warming trend is caused by the recovery (warming) from the Little Ice Age, a natural phenomenon, based on the published oxygen isotope (O^{18}) data, which are obtained from ice cores or deposit cores. Indeed, the temperature has been increasing almost linearly from 1800 or a little earlier to the present. There is no way to explain such a fact by the CO_2 hypothesis. If this is indeed the case, the IPCC considerably overestimated the greenhouse effect of manmade CO_2 by ignoring the contribution made by natural changes.

There are undoubtedly many exceptions and thus objections to the sweeping categorization made in this note. Nevertheless, I believe that there is some truth in my analysis. It is my hope that my view might put global warming studies on a healthier track by understanding the nature of both groups and by encouraging healthier debates, and also removing the mistrust between the two groups.