

Science and Hollywood: a discussion of the scientific accuracy of *An Inconvenient Truth*

Introduction

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An Inconvenient Truth (hereafter AIT) is a documentary about Al Gore's campaign to educate citizens about global warming and inspire them to take action. Although scientists do not view Hollywood as the best way to communicate accurate scientific information, it is hard to ignore the impact that AIT has had on the general public. Since AIT was released in May 2006 it has grossed more than \$49 million dollars worldwide (ranking it as the fourth highest all-time grossing documentary).¹ AIT garnered additional attention by winning two Academy Awards (including Best Documentary Feature) and in 2007 Al Gore shared The Nobel Peace Prize with the Intergovernmental Panel on Climate Change for his "efforts to build up and disseminate greater knowledge about man-made climate change, and to lay the foundation for the measures that are needed to counteract such change".² Whether scientists like it or not, AIT has had a much greater impact on public opinion and public awareness of global climate change than any scientific paper or report.

This forum contains four papers discussing the scientific accuracy of AIT. The focus of this forum is to address whether AIT accurately presents the scientific argument that global warming is caused by human activities. The authors were asked to only

address the scientific statements in AIT, setting aside the moral, ethical, and legal questions pertaining to what should be done about global warming. As mentioned by Nielsen-Gammon in his contribution to this forum, some might feel that it is unfair to discuss the scientific accuracy of AIT since "the purpose of the movie was not to present a scientific argument, but rather to inspire action, and in that sense the movie was very successful and its scientific flaws were not sufficient to prevent it from having a major impact on public opinion". However, since this movie is being used to educate citizens about anthropogenic global warming it is worth discussing whether AIT gets the science right.

By design, the papers included in this forum provide different perspectives on anthropogenic global warming and AIT. Two of the scientists (Nielsen-Gammon and Steig) believe that the Intergovernmental Panel on Climate Change's (IPCC) fourth assessment report provides a comprehensive summary of the scientific basis of global warming causes and effects, while the other two (Legates and Spencer) are critical of the IPCC report (so-called skeptics). Although the four papers included in this forum have undergone peer-review, they should be considered opinion pieces since the authors were encouraged to express their personal views. This

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¹ Data provided by www.boxofficemojo.com (accessed December 28, 2007).

² www.nobelprize.org (accessed October 29, 2007).

forum concludes with a synthesis paper written by Professor Gerald North that discusses the current state of climate change science and responds to the four commentaries on AIT.

Despite the authors varied perspectives, there are a number of common themes that permeate the four papers. All of the authors agree that AIT does an excellent job of raising public awareness of anthropogenic global warming and explaining why increased atmospheric concentrations of greenhouse gases leads to warming. The authors also agree that one of the main weaknesses of AIT is that it tries to use individual events (e.g., Hurricane Katrina) to prove that global warming is occurring.

One common criticism is how Gore explained the relationship between temperature and carbon dioxide in the long ice core records. Because the temperature history from the ice core records is shown alongside the carbon dioxide concentrations, it has the effect of implying that the temperature change will be much larger than is projected by climate models. The authors also noticed that Gore only discusses anthropogenic causes of climate change in AIT and does not describe important natural causes such as those that can be attributed to orbital variations, volcanic activity and solar forcing. Despite these common themes, each author had a unique perspective on AIT.

In “Another look at *An Inconvenient Truth*” Steig argues that, although there are some minor factual errors, AIT gets the fundamental science right. The factual errors that are present in the film are inconsequential and do not undermine the main message of the film. Steig concludes that although the scientific message is accurate, the response to climate change is based on personal values.

Spencer in his paper “*An Inconvenient Truth*: blurring the lines between science and science fiction” contends that the true state of knowledge about global warming is much less certain than is portrayed in AIT. In particular he focuses on the problems associated with how Gore uses extreme events (e.g., hurricanes and tornadoes) to prove global warming. Spencer also notes that there is no mention of natural climate variability.

In “*An Inconvenient Truth*: a focus on its portrayal of the hydrologic cycle” Legates focuses on evaluating the scientific accuracy of statements made in AIT about changes in the hydrologic cycle that are expected to occur as a result of anthropogenic global

warming. Legates’ specifically addresses assertions made by AIT about trends in precipitation, floods, droughts, and storminess. He concludes that observational data fail to support many of the claims made in AIT and that there appears to be a bias in AIT toward catastrophe scenarios.

Nielsen-Gammon in his paper “*An Inconvenient Truth*: the scientific argument” outlines the main scientific argument presented in AIT. Nielsen-Gammon notes that Al Gore does an excellent job of conveying the relevant scientific information in a memorable way. However, he also points out that the scientific argument presented in AIT relies almost entirely on the observational record. The author notes that the most serious flaw in AIT is that Gore never provides model-based projections of future global temperature increases but instead encourages the audience to make their own projections based on the Vostok temperature and carbon dioxide graphs. The reliance on observed data and recent events, although effective, leads the audience to incorrectly believe that every recent drought, flood, and hurricane is a consequence of global warming. Nielsen-Gammon concludes that although the main scientific argument in AIT agrees with the scientific consensus, Gore has chosen to focus on recent events as portents of future climate change. This increases the emotional impact of AIT but decreases the validity of the scientific argument.

In his paper “*An Inconvenient Truth* and the scientists”, North provides a succinct summary of the state of climate change science and argues that climate science has evolved into what Thomas Kuhn described as a ‘paradigm’. In particular, North feels that climate science is now in what Kuhn called the ‘normal science’ phase, where there is a strong consensus among climate scientists that there is truth in the paradigm. He argues that in contrast to the positive statements made by scientists, AIT is a powerful example of the use of mixed statements (it uses both positive and normative statements). In this case, Gore’s mission was to take a hypothesis that he believes is essentially correct and use the most powerful means he can muster to convince the viewer. He summarizes the four papers included in this forum by concluding that there are some inaccuracies and exaggerations in AIT, but on the whole it represents mainstream scientific views on global warming.

Accurately communicating scientific knowledge (and the associated uncertainties) to non-specialists is difficult because scientists, politicians and the general public often lack common ground in regards to education and vocabulary, and each individual/group has unique motivations and concerns. Communicating scientific knowledge about climate change to the general public is especially problematic because of the complexity of the science and the diversity of viewpoints held by scientists (such as those expressed by the authors in this issue). However, this does not mean that scientists should shy away from attempting to educate the public and inform policy. *An Inconvenient Truth* is a powerful example of how scientific knowledge can be communicated to a lay audience. Scientists may argue about the accuracy of the

message of AIT, but there is no debating its effectiveness. Al Gore and the Intergovernmental Panel on Climate Change were both recognized by the Nobel Committee for disseminating knowledge about anthropogenic global warming. However, each disseminated knowledge in a unique way. As Nielsen-Gammon noted in his article “the IPCC reports remain the best available comprehensive summary of the scientific basis of global warming causes and effects”. The detailed scientific material contained in the IPCC reports and their comprehensive nature means that these reports will be most useful for scientists and policy makers. On the other hand, AIT is an accessible and emotionally powerful means of communicating scientific knowledge to the general public (even if it is not always scientifically accurate).