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Dear Paul M Grant

The APS invites you to express your views on the proposed Commentary to accompany the 2007 APS Climate Change Statement.

Thank you for your thoughtful participation in this process. Below you will find some background information on this issue, followed by the text of the 2007 Statement and the proposed Commentary to be added to the Statement. You may then enter your comments in the box at the bottom of the page.

Please note that this link is exclusive to you, and you may only submit comments one time. Once submitted, your comments cannot be edited. If you have any questions regarding the process, please contact webmaster@aps.org.

[Background Information for APS Members on Proposed Commentary](#)

An ad hoc subcommittee of the APS Panel on Public Affairs (POPA) recently prepared a Commentary on the 2007 Statement in response to a charge to POPA from the APS Council to "...review the 2007 Council Statement (07.1 Climate Change) with a view to addressing the issues of clarity and tone raised in the report of the Kleppner committee" to the APS president.

On February 5, POPA unanimously accepted the Commentary and recommended that it be included as an addendum to the 2007 Climate Change Statement. In accordance with APS Executive Board action on February 12, the proposed Commentary is posted for three weeks to allow APS membership comments. The POPA subcommittee will examine the membership responses and amend the Commentary as it deems appropriate in preparation for Council consideration in April.

The POPA ad hoc subcommittee comprises current or past members of POPA who are not researchers in the field of climate change or related areas. None have any connection to the preparation of the 2007 APS statement.

The subcommittee interviewed five scientific leaders with a range of views and areas of expertise in the field of climate change to discuss the APS statement and the underlying scientific issues: Donald Boesch (Univ. of Maryland), Isaac Held (Geophysical Fluid Dynamics Laboratory), Richard Lindzen (MIT), Michael MacCracken (Climate Institute), and Gerald North (Texas A&M Univ.). One of the subcommittee members also acknowledges valuable discussions with Inez Fung (UC Berkeley). In addition to the interviews, the subcommittee members examined a number of scientific papers related to climate change.

[2007 APS Statement on Climate Change \(07.1 Climate Change\)](#)

(Adopted by Council on November 18, 2007)

Emissions of greenhouse gases from human activities are changing the atmosphere in ways that affect the Earth's climate. Greenhouse gases include carbon dioxide as well as methane, nitrous oxide and other gases. They are emitted from fossil fuel combustion and a range of industrial and agricultural processes.

The evidence is incontrovertible: Global warming is occurring. If no mitigating actions are taken, significant disruptions in the Earth's physical and ecological systems, social systems, security and human health are likely to occur. We must reduce emissions of greenhouse gases beginning now.

Because the complexity of the climate makes accurate prediction difficult, the APS urges an enhanced effort to understand the effects of human activity on the Earth's climate, and to provide the technological options for meeting the climate challenge in the near and longer terms. The APS also urges governments, universities, national laboratories and its membership to support policies and actions that will reduce the emission of greenhouse gases.

[Proposed Commentary to Accompany APS 2007 Climate Change Statement \(07.1 Climate Change\)](#)

There is a substantial body of peer reviewed scientific research to support every technical sentence in the 2007 APS statement. However, there is no doubt that clarification is needed in a few areas.

The first sentence of the APS statement is broadly supported by observational data, physical principles, and global climate models. The sentence can be further elaborated. Greenhouse gas emissions are changing the earth's energy balance on a planetary scale in ways that affect the climate over long periods of time (~100 years). Historical records indicate that climate is sensitive to energy changes. It is not just the atmosphere, but also the oceans and land that are involved in the complex dynamics that result in global climate. Aerosols and particulates resulting from human and natural sources also play roles that can either offset or reinforce greenhouse gas effects. While there are factors driving the natural variability of climate (e.g., volcanoes, solar variability, oceanic oscillations), there have been no credible natural mechanisms proposed to explain all of the observed warming in the past century. Warming is observed in land surface temperatures, sea surface temperatures, and for the last 30 years, lower atmosphere temperatures measured by satellite. The second sentence is simply a definition. The third sentence notes the human contributions to greenhouse gases. There are, of course, natural sources as well.

The evidence for global temperature rise over the last century is compelling. However, the use of the word "incontrovertible" in the first sentence of the second paragraph has created much of the controversy regarding the 2007 APS statement. This word is rarely used in science because by its very nature science always questions prevailing ideas. The magnitude of the observed warming can be debated but the majority of evidence (observational data) indicates a warming of approximately 0.8°C from 1900 to the present.

The second sentence in the second paragraph predicts that significant disruptions in the Earth's physical and ecological systems, social systems,

security and health are "likely" although the word "likely" is not defined. This sentence needs further explanation. Such predictions are based on climate models that calculate the effects of anthropogenic changes on the ecosphere, such as doubling of the CO₂-equivalent [1] concentration relative to its pre-industrial value by the year 2100. These models have uncertainties associated with the radiative forcing functions, especially clouds and water vapor. However, the vast majority of the models show that water vapor is also a net positive forcing function (in addition to CO₂ and other gases) on global temperatures. The impact of clouds is less certain because of their dual role as scatterers of incoming solar radiation and as greenhouse contributors. The magnitude of the effect of human activity on climate continues to be debated, as reflected in the broad distribution of the predicted magnitude of the consequence of doubling of the CO₂-equivalent concentration. The estimates from various climate scientists for doubling CO₂-equivalent concentration range from an increase of ~1°C to 2-3°C with the probability distributions having long tails out to much larger temperature changes.

The last sentence in the second paragraph articulates an immediate policy action to reduce greenhouse gas emissions to deal with the possible catastrophic outcomes that could accompany large global temperature increases. Even with the uncertainties in the models, it is increasingly difficult to escape the conclusion that non-negligible increases in global temperature are accompanying rising anthropogenic CO₂. Thus given the significant risks associated with global temperature rise, prudent steps should be taken to reduce greenhouse gas emissions now while continuing to improve the observational data and the model predictions.

The third paragraph, first sentence, recommends an enhanced effort to understand the effects of human activity on Earth's climate. This sentence should be interpreted broadly and more specifically: an enhanced effort is needed to understand both anthropogenic processes and the natural cycles that affect the Earth's climate. Improving the scientific understanding of all climate feedbacks is critical to reducing the uncertainty in modeling the consequences of doubling the CO₂-equivalent concentration. In addition, more extensive and more accurate scientific measurements are needed to test the validity of climate models to increase confidence in their projections.

With regard to the last sentence of the APS statement, the role of physicists is not just "...to support policies and actions..." but also to participate actively in the research itself. Physicists can contribute in significant ways to understanding the physical processes underlying climate and to developing technological options for addressing and mitigating climate change.

[1] The concentration of CO₂ that would give the same amount of radiative forcing as a given mixture of CO₂ and other greenhouse gases (methane, nitrous oxide, etc.). Essentially, the models sum the radiative forcing of all trace gases and treat the total forcing as if it comes from an "equivalent" CO₂ concentration. The calculation of CO₂-equivalent forcing for all gases other than CO₂ takes into account only increments relative to their pre-industrial values, so that the pre-industrial forcing for CO₂ and CO₂-equivalent are the same.

Your Views on the Proposed Commentary

Enter your remarks on the proposed Commentary below (text only, please), limited to 500 words/3500 characters:

Extracts from a letter to Epstein, et al., on 8 December 2009. The complete letter can be found on my website at [www.w2agz.com/Publications/Opinion & Commentary/Op-Eds & Letters/APS Climate Change Statement](http://www.w2agz.com/Publications/Opinion%20&%20Commentary/Op-Eds%20&%20Letters/APS%20Climate%20Change%20Statement).

To All,

As one of the signers of the recent Austin-Cohen-Lewis petition submitted to the Council urging it to amend its 2007 statement on global warming, I wanted to use this 11th hour opportunity to write personally to several of you whom I've met on occasion during my brief

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