"A Broader View of the Role of Humans in the Climate System is Required In the Assessment of Costs and Benefits of Effective Climate Policy"

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of the Committee on Energy and Commerce

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Summary

The human addition of CO_2 into the atmosphere is a first-order climate forcing. We need an effective policy to limit the atmospheric concentration of this gas. However, humans are significantly altering the climate system in a diverse range of ways in addition to CO_2. The information that I am presenting will assist in properly placing CO_2 policies into the broader context of climate policy.

Climate is much more than just long term weather statistics but includes all physical, chemical and biological components of the atmosphere, oceans, land surface and glacier covered areas. In 2005, the National Research Council published a report "Radiative forcing of climate change: Expanding the concept and addressing uncertainties" that documented that a human disturbance of any component of the climate system, necessarily alters other aspects of the climate.

1. Introduction

The role of humans within the climate system must be one of the following three possibilities

- **The human influence is minimal and natural variations dominate climate variations on all time scaled;**
- **While natural variations are important, the human influence is significant and involves a diverse range of first-order climate forcings, including, but not limited to the human input of CO_2;**
- **The human influence is dominated by the emissions into the atmosphere of greenhouse gases, particularly carbon dioxide**

My testimony presents evidence that the correct scientific conclusion is that

> **The human influence on climate is significant and involves a diverse range of first-order climate forcings, including, but not limited to the human input of CO_2.**

2. Conclusions of the National Research Council – Human Climate Forcings Are More Than Just The Radiative Forcing of the Well-mixed Greenhouse Gases

In 2005, the National Research Council published the report:

National Research Council, 2005: Radiative forcing of climate change: Expanding the concept and addressing uncertainties. Committee on Radiative Forcing Effects on Climate Change, Climate Research Committee, Board on Atmospheric Sciences and

Climate, Division on Earth and Life Studies, The National Academies Press, Washington, D.C., 208 pp.

Figure 1, from the 2005 National Research Council report, illustrates that a human disturbance of any component of the climate system, necessarily alters other aspects of the climate. Climate is much more than just long-term weather statistics but includes all physical, chemical, and biological components of the atmosphere, oceans, land surface, and glacier-covered areas.

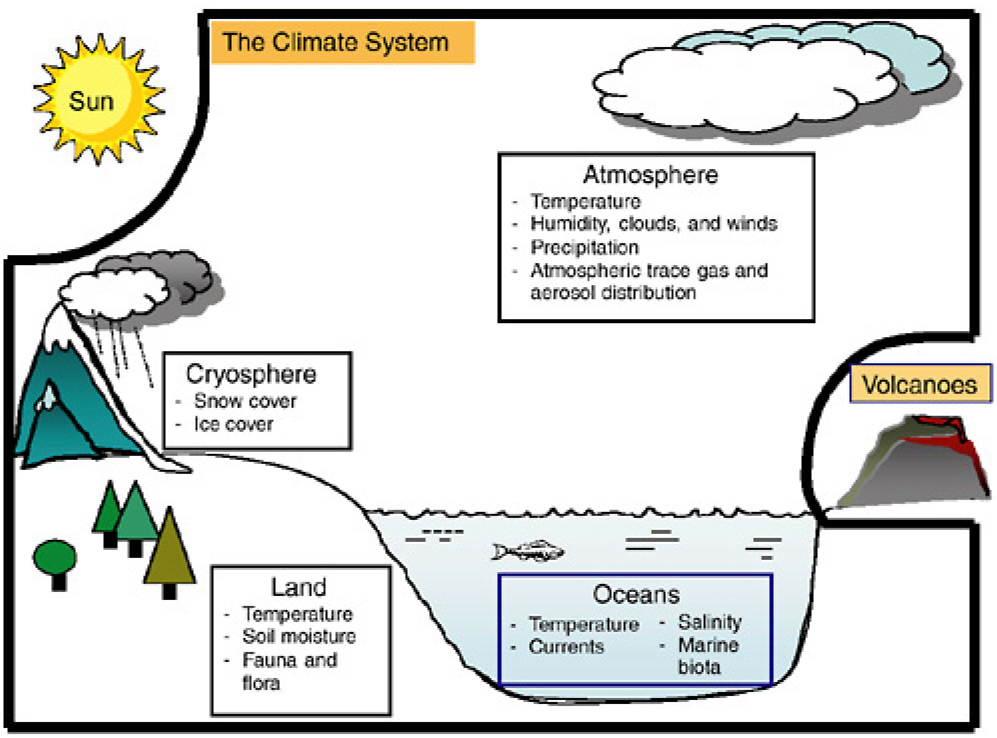

FIGURE 1: The climate system, consisting of the atmosphere, oceans, land, and cryosphere. Important state variables for each sphere of the climate system are listed in the boxes. For the purposes of this report, the Sun, volcanic emissions, and human-caused emissions of greenhouse gases and changes to the land surface are considered external to the climate system [from NRC, 2005]

The 2005 National Research Council Report concluded that the

- *"global mean surface temperature response [offers] little information on regional climate change or precipitation"*

- *“Regional variations in radiative forcing may have important regional and global climatic implications that are not resolved by the concept of global mean radiative forcing. Tropospheric aerosols and landscape changes have particularly heterogeneous forcings”*

and

- *Regional diabatic heating [from tropospheric aerosols and landscape changes] can… cause atmospheric teleconnections that influence regional climate thousands of kilometers away from the point of forcing”*

Humans, therefore, have a more diverse influence on the climate system than is represented by a focus on anthropogenic inputs of CO_2 into the atmosphere. Other investigators agree on the significance of regional heating on weather patterns. For example, as written in Palmer et al. (2008):

“As is well known, systematic changes in diabatic heating fields will perturb the planetary-wave structure of the atmosphere, in both the tropics and the extratropics”

and

“It will be decades before climate change projections can be fully verified.”

There is substantial research that supports the conclusions from the 2005 National Research Council report that the human role in the climate system is more diverse than focusing only on the global warming effect of CO_2..

2a. the influence of human-caused aerosols on regional (and global) radiative heating [e.g., Ramanathan et al. 2007, Ramanathan and Carmichael 2008; Chung and Ramanathan 2003; Matsui and Pielke Sr. 2006; Niyogi et al. 2004; Rosenfeld 2006]

The presence of aerosols in the atmosphere from such human activities as fossil fuel combustion, burning of pastures and forests, and dust from degraded landscapes alters the amount of sunlight reflected back into space, and the absorption of heat within the atmosphere and at the surface. This changes the regional and global average radiative heating and cooling.

The regional heating that results from these human climate forcings produces temperature increases or decreases in the layer-averaged regional troposphere. This necessarily alters the regional pressure fields and thus the wind pattern. This pressure and wind pattern then affects the pressure and wind patterns at large distances from the region of the forcing which we refer to as teleconnections. Even surface variations such in ocean color produce such teleconnections in a general circulation model (e.g., see Shell et al. 2003).

In Matsui and Pielke Sr. (2006), it was found from observations of the spatial distribution of aerosols in the atmosphere in the lower latitudes, that the aerosol effect on atmospheric circulations, as a result of their alteration in the heating of regions of the atmosphere, is 60 times greater than due to the heating effect of the human addition of well-mixed greenhouse gases.

2b. The effect of aerosols on cloud and precipitation processes [e.g., Andreae and Rosenfeld, 2008; Rosenfeld et al. 2006, 2007; Shepherd 2006]

The presence of aerosols within the atmosphere alters cloud processes including precipitation. Among their effects, as summarized in Table 2-2 in the 2005 National Research Council report, are alterations in the lifetime of clouds, the ability of clouds to rain or snow, and the height in the atmosphere at which freezing of cloud droplets occur.

The effect of this human disturbance of the climate system extends almost worldwide. As reported in Andreae and Rosenfeld (2008), *"Model calculations and observations in remote continental regions consistently suggest that [aerosol] concentrations over the pristine continents were similar to those now prevailing over the remote oceans, suggesting that human activities have modified cloud microphysics more than what is reflected in conventional wisdom."*

2c. The influence of aerosol deposition on climate [e.g. see Biello 2007; Strack et al. 2007; Flanner et al. 2007; Myhre et al. 2005; Lamarque et al. 2005; Galloway et al. 2004; Holland et al. 2005]

The depositing of aerosols at the surface alters the reflection of sunlight back into the atmosphere, as well as alters the growth of plants. In the Arctic, for example, Biello (2007) concludes that

"…. on snow—even at concentrations below five parts per billion—such dark carbon triggers melting, and may be responsible for as much as 94 percent of Arctic warming".

Increases in the deposition of nitrogen are also a major climate forcing, and are expected to increase during the current century**.** This deposition has altered the functioning of soil, terrestrial vegetation, and aquatic ecosystems worldwide. Galloway et al. (2004) document that human activities increasingly dominate the nitrogen budget at the global scale and that fixed forms of nitrogen are accumulating in most environmental reservoirs. Lamarque et al. (2005) conclude that

"In 2100 the nitrogen deposition changes from changes in the climate account for much less than the changes from increased nitrogen emissions."

The added nitrogen changes plant growth, and thus the reflection of sunlight from the surface, as well as the amount of vegetation available to transpire water vapor into the atmosphere.

2d. The effect of land cover/ land use on climate [e.g. Feddema et al. 2005; Salmun and Molod 2006; Marland et al. 2003; Avissar and Werth, 2005; Kleidon 2006; Mahmood et al. 2006a; Friedlingstein et al. 2001; Cox et al. 2000; Pielke 2001, 2005; Cotton and Pielke, 2007; Kabat et al. 2004; NASA, 2002, 2005]

Land-cover and land-use variations and change alter climate by changing the surface reflection of solar radiation into space, as well as the amount of heat that is transferred into the atmosphere in the form of water vapor and sensible heat. As reported in Pielke (2001)

> *"The net effect of deliberate landscape change such as afforestation may actually result in a radiative warming effect even though* CO_2 *is extracted from the atmosphere by the plants. This occurs if the resulting surface albedo is less than for the original landscape and due to the added water vapor that is transpired into the atmosphere from the vegetation."*

Figure 2 shows that changing the current landscape (top) back to the natural landscape (bottom) in an atmospheric model for the same large-scale weather features results in a drastic alteration of the weather in the Texas and Oklahoma panhandle from a severe thunderstorm (which was observed) to just a shallow line of cumulus clouds. Figure 3 and 4 illustrate the drastic changes in landscape due to human management in Florida and in the eastern United States.

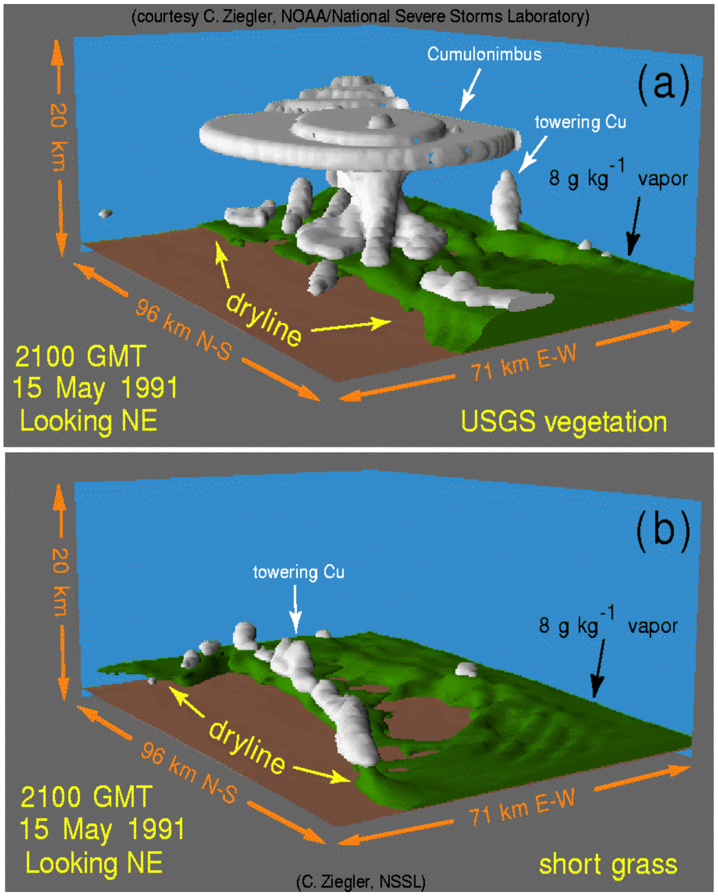

Figure 2: **From: Pielke, R.A., T.J. Lee, J.H. Copeland, J.L. Eastman, C.L. Ziegler, and C.A. Finley, 1997: Use of USGS-provided data to improve weather and climate simulations. *Ecological Applications*, 7, 3-21.**

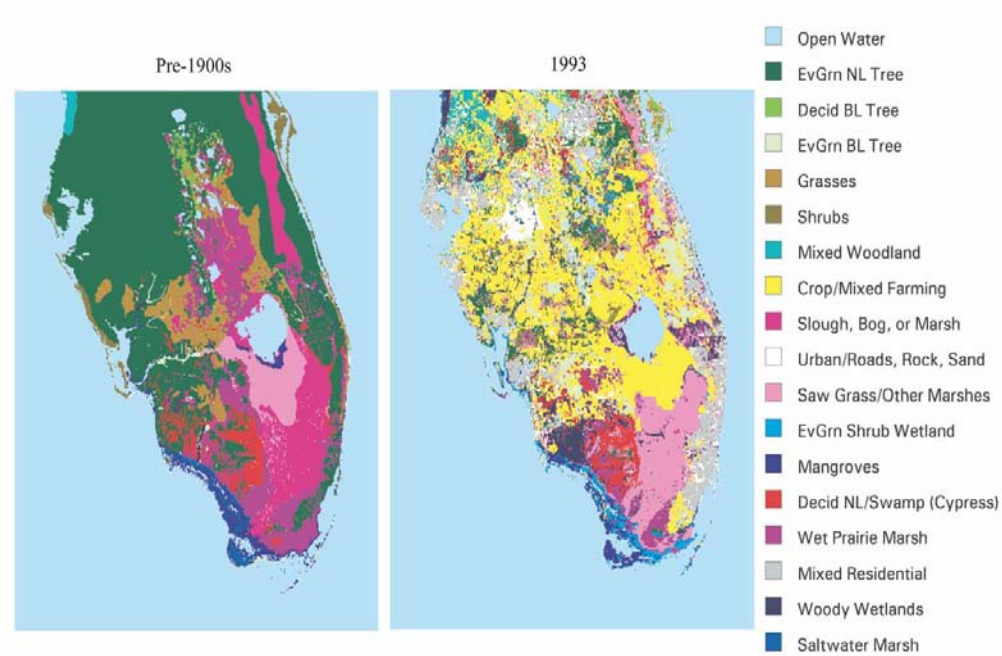

Figure 3: The observed landscape change in the 20th century for central and south Florida (from Marshall, C.H. Jr., R.A. Pielke Sr., L.T. Steyaert, and D.A. Willard, 2004: The impact of anthropogenic land cover change on warm season sensible weather and sea-breeze convection over the Florida peninsula. *Mon. Wea Rev*., 132, 28-52.)

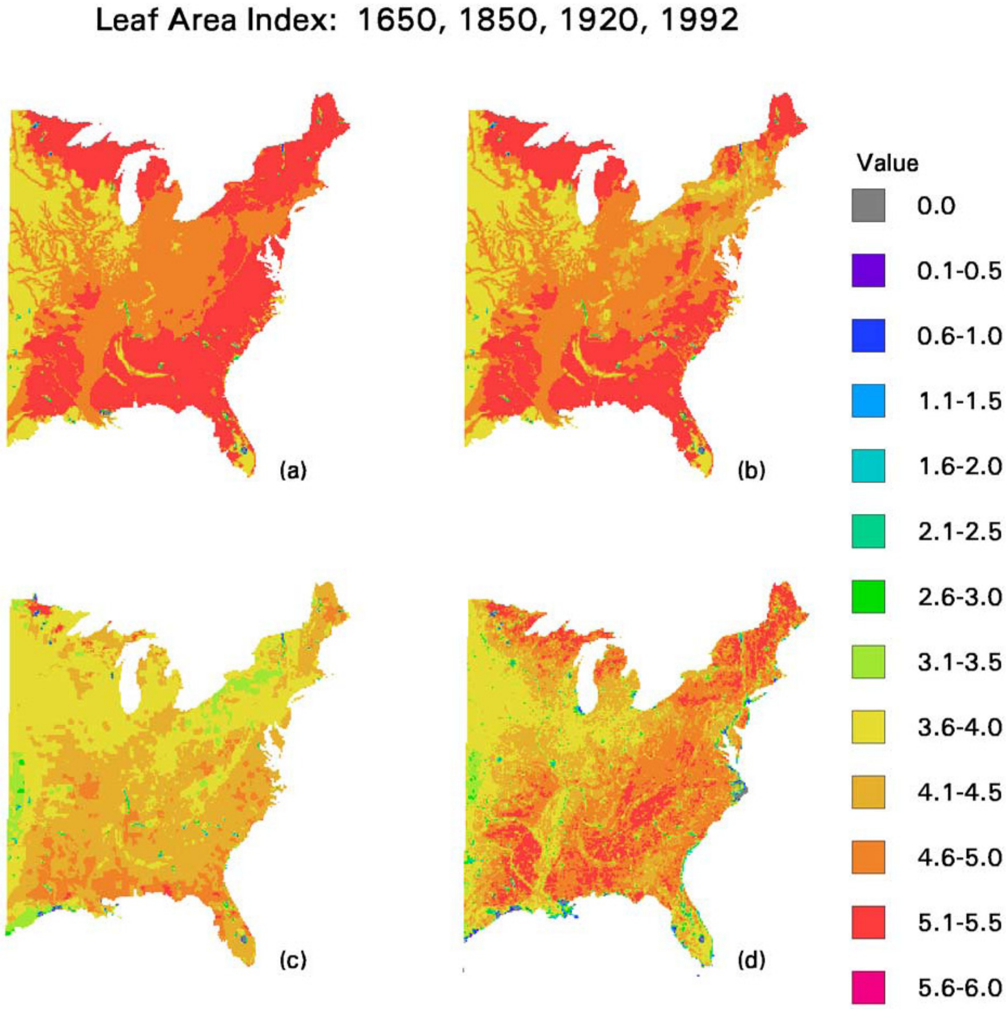

Figure 4: Distributions of average peak-season leaf area index (LAI) estimated for (a) 1650, (b) 1850, (c) 1920, and (d) 1992 time slices. With the exception of urban centers and certain degraded lands, average peak LAI for typical 10-km cells varied by 20% to 30%, variation comparable to differences among published field measurements within the same type of land cover From Steyaert and Knox (2008).

This effect extends worldwide, as demonstrated, for example, in Feddema et al. (2005) where they conclude that with respect to future land use change

"Agricultural expansion ……. results in significant additional warming over the Amazon and cooling of the upper air column and nearby oceans. These and other influences on the Hadley and monsoon circulations affect extratropical climates."

In a NASA article [NASA, 2005 Gordon Bonan of NCAR stated

"Nobody experiences the effect of a half a degree increase in global mean temperature," Bonan says. "What we experience are the changes in the climate in the place where we live, and those changes might be large. Land cover change is as big an influence on regional and local climate and weather as doubled atmospheric carbon dioxide—perhaps even bigger."

2e. The biogeochemical effect of added atmospheric CO_2 [e.g., Pielke 2001; Pielke et al. 2002; Cox et al. 2000; Eastman et al. 2001; Friedlingstein et al. 2001; Cramer et al. 2001].

The addition of CO_2 into the atmosphere alters plant carbon assimilation and therefore the amount of water vapor transpired into the atmosphere. Plant growth is also altered. Cox et al. (2000) and Friedlingstein et al. (2001) conclude that the plant response to added CO_2 would amplify the warming from the radiative effect of increased CO_2, although they obtain quite different regional effects. Eastman et al. (2001) found a decrease in maximum temperatures and an increase in nighttime minimum temperatures as a result of the biogeochemical effect of doubled CO_2 in the grasslands of the Great Plains, while no significant effect resulted from the radiative changes from the added CO_2.

The research documents a first-order climate effect but its regional consequences are not well understood. Cramer et al. (2001) conclude that

"the magnitude of possible biospheric influences on the carbon balance requires that this factor is taken into account for future scenarios of atmospheric CO_2 and climate change."

The conclusion is that humans are significantly altering global and regional climates in a variety of diverse ways beyond the radiative effect of carbon dioxide is, therefore, supported by a substantial peer-reviewed literature. The assessments of costs and benefits of particular mitigation and adaptation policy actions that are intended to influence climate must include all of these diverse climate forcings.

3. Weather and Agricultural, Hydrologic and Other Impacts Respond to Regional Climate Forcings and Feedbacks Not a Global Average Temperature Trend

3a. Can regional scale climate be predicted decades into the future?

The CCSP Report "The effects of climate change on agriculture, land resources, water resources, and biodiversity in the United States" accepts model predictions and presents them as skillful predictions by the agricultural, land resources, water resources, and biodiversity impacts communities. The main focus of this assessment is the next 25-50 years. The report claims that

> "*the climate change that will occur during this period is relatively well understood. Much of this change will be caused by greenhouse gas emissions that have already happened.*"

However, as shown in Section 2, the regional climate is influenced by a variety of human climate forcings besides CO_2. The global models must include all of the first-order human climate forcings as a necessary condition for skillful predictions.

As the 2007 IPCC report admitted, however, even in the context of the global average top of the atmosphere radiative forcing, they do not have all of the first-order climate forcings. They write in the caption to Figure SPM.2 with respect to the global average radiative forcings that.

> *Additional forcing factors not included here are considered to have a very low LOSU……"* [LOSU means "level of scientific understanding"]

There is no way that a skillful forecast of global and regional decades into the future can be made if all of the first-order climate forcings are not included.

3b. Can climate model predicted multi-decadal regional scale climate variations and change be attributed to specific human climate forcings?

Since all first-order human climate forcings are not included, as presented in Section 2, the attribution of specific climate forcings to a regional response is not yet scientifically robust.

With respect to assessing climate model skill, there have been recent studies on this issue. For example, as reported in Gleckler et al. (2008),

> *"Unlike numerical weather prediction, there is currently no widely accepted suite of metrics for evaluating climate model performance."*

One of the lead authors of the 2007 IPCC report, Kevin Trenberth, although otherwise a strong proponent of the global model predictions, stated in a candid admission [Trenberth 2007] that

> *"In fact there are no predictions by IPCC at all. And there never have been.… None of the models used by IPCC are initialized to the observed state and none of the climate states in the models correspond even remotely to the current observed climate.… I postulate that regional climate change is impossible to deal with properly unless the models are initialized……..the science is not done because we do not have reliable or regional predictions of climate."*

There are even serious issues with the data that is used to validate the model predictions as well as to monitor long-term climate. For example, there are uncertainties and biases in the temperature data used to validate the model results and to assess multi-decadal temperature trends.

The land surface temperature data record is an integral component of the CCSP reports (e.g., CCSP 2006; 2008a,b). However, as one example of a data issue, the global average surface temperature trends that have been used to validate the global climate model multi-decadal predictions have been shown to have unresolved issues as discussed in a range of peer-reviewed papers [e.g. Pielke et al. 2007a,b; Walters et al. 2007; Mahmood et al. 2006b; Hale et al. 2006; Pielke and Matsui 2005; Davey and Pielke 2005].

Based on this research, for example, we found a conservative estimate of the warm bias resulting from measuring the temperature near the ground of around 0.21°C per decade (with the nighttime minimum temperature contributing a large part of this bias). Since land covers about 29% of the Earth's surface, the warm bias due to this influence explains about 30% of the IPCC estimate of global warming**.** In other words, consideration of the bias in temperature would reduce the IPCC trend to about 0.14°C per decade; still a warming, but not as large as indicated by the IPCC.

The message from such research is that the use of this data in the CCSP assessments will provide an erroneous overstatement of warming in the United States. Since the model predictions in the CCSP reports require this data for their impact assessments, the confidence that is placed on their use for such assessments is misplaced.

The stations used to collect temperature data are also often inappropriately located, as documented for many of the US historical climate reference network sites by Anthony Watts [see http://gallery.surfacestations.org/main.php?g2_itemId=20]. Several photographs from these sites illustrate the major shortcoming with using them in the construction of a global average surface temperature trend [see Figures 5 and 6].

The immediate environment around these sites is also changing over time as vegetation grows or is removed, air conditioners are added, buildings are relocated, etc. This poor siting introduce a substantial uncertainty in assessing extreme temperatures and temperature trends.

Figure 5: Location of measurement site used in long-term temperature trend assessments from Baltimore, Maryland. [http://gallery.surfacestations.org/main.php?g2_itemId=3174]

3c. Can climate model predicted multi-decadal regional scale climate variations and change be used for impacts assessments?

In order to use multi-decadal climate model predictions for accurate impacts assessments, they must have regional and local skill. However, as presented in Section 2, the models do not have this level of skill.

Figure 6: - Location of measurement site used in long-term temperature trend assessments at Lexington, Virginia [from http://gallery.surfacestations.org/main.php?g2_itemId=16000]

The spatial patterns of drought and of sea surface temperature anomalies in Figures 7 and 8 illustrate that regional scale information is needed. However, the global models do not yet have skill at downscaling to regional and local scales, and thus are unable to provide robust information on this spatial scale to the impacts communities. This limitation has been documented in several papers; e.g. Castro et al, 2005; 2007; Lo et al. 2008; Rockel et al. 2008)

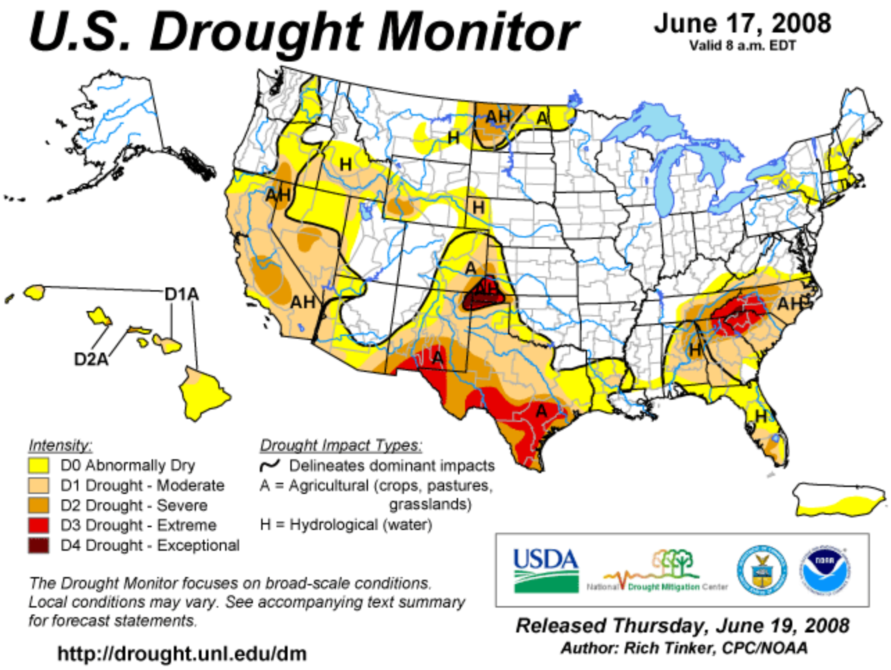

Figure 7: Drought conditions across the United States [from http://drought.unl.edu/dm/monitor.html].

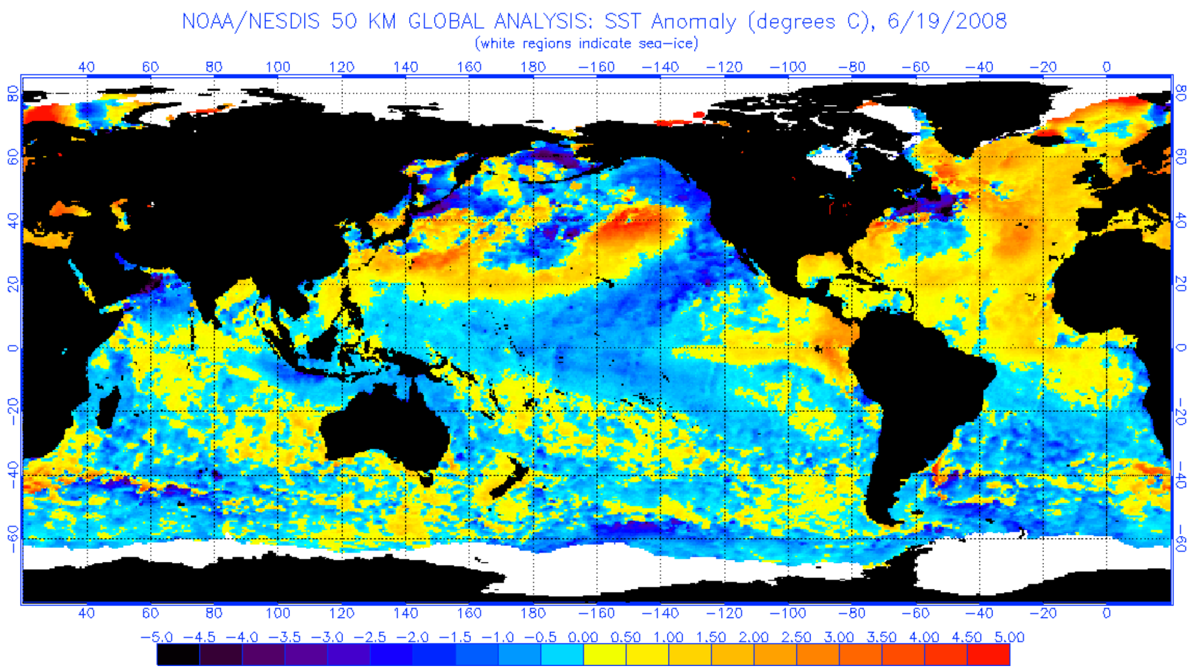

Figure 6: Global sea surface anomalies for June 19 2008 [from http://www.osdpd.noaa.gov/PSB/EPS/SST/data/anomnight.6.19.2008.gif]

In the Castro et al. (2007) paper it was concluded that

> *"In order for RCMs [regional climate model using information from a global climate model [GCM] to be successful in a seasonal weather prediction mode for the summer season, it is required that the GCM provide a reasonable representation of the teleconnections and have a climatology that is comparable to a global atmospheric reanalysis."*

Accurate seasonal regional prediction is a necessary requirement for multi-decadal climate predictions. The multi-decadal global models have not demonstrated skill at predicting on the seasonal scale.

As written in Lo et al. (2008)

> *"Regional climate simulations that rely on those predictions for LBCs and nudging are thus dominated by the global model information."*

Therefore, if the global models do not have all of the first-order human climate forcings, they cannot skillfully predict regional and local impacts.

4. Illustration of the Absence of Recognition in the CCSP Report of the Diversity of Human Climate Forcings

The neglect of the 2005 National Research Council report recommendation to broaden the assessment of the human role within the climate system was ignored in the WG1 report by the 2007 IPCC. This is illustrated for two chapters in the Appendix to this testimony.

The CCSP reports similarly ignore relevant peer-reviewed research [see Pielke, 2005 for an explanation of the conflict of interest involved with these assessments]. For example, in CCSP (2008) model predictions are accepted as robust and presented as skillful predictions by the agricultural, land resources, water resources, and biodiversity impacts communities. The report, in the CCSP Executive Summary, writes that

> *"our main focus is on the recent past and the nearer-term future – the next 25 to 50 years. This period is within the planning horizon of many natural resources managers. Furthermore, the climate change that will occur during this period is relatively well understood. Much of this change will be caused by greenhouse gas emissions that have already happened. It is thus partially independent of current or planned emissions control measures and the large scenario uncertainty that affects longer-term projections".*

They further write that

> *"The IPCC AR4 projects that the global average temperature will rise another 1.1 to 5.4°C by 2100, depending on how much the atmospheric concentrations of greenhouse gases increase during this time."*

Clearly, the impacts of climate change on agriculture, land resources, water resources, and biodiversity in the United States are based on model results whose main human driver is the addition of greenhouse gases into the atmosphere through human activity. Ignored in preparing these assessments are the role of all of the human climate forcings that are presented in Section 2 of this testimony**.**

5. Conclusions

Thus, climate policy that is designed to mitigate the human impact on regional climate by focusing only on the emissions of CO_2 is seriously incomplete unless these other first-order human climate forcings are included, or complementary policies for these other human climate forcings are developed. Moreover, it is important to recognize that climate policy and energy policy, while having overlaps, are distinctly different topics with different mitigation and adaptation options.

A way forward with respect to a more effective climate policy is to focus on the assessment of adaptation and mitigation strategies that reduce vulnerability of important societal and environmental resources to both natural and human caused climate variability and change. For example, restricting development in flood plains or in hurricane storm surge coastal locations is an effective adaptation strategy regardless of how climate changes.

This approach has been proposed in Kabat et al. (2004) and Pielke (2004) and summarized in Pielke (2004) where it is stated,

> *"The framework for vulnerability assessments …. is place-based and has a bottom-up perspective, in contrast to the GCM-focus [multi-decadal global model predictions] which is a top-down approach from a global perspective The vulnerability focus is on the resource of interest – [e.g.] water resources ……. The challenge is to use resource specific models and observations to determine thresholds at which negative effects occur associated with the resource. Changes in the climate (represented therein by weather and land surface dynamics) represent only one threat to the resource; the climate itself may also be significantly altered by changes in the resource, and there are multiple, nonlinear interactions between the forcings…"*

In conclusion, humans are significantly altering the global climate, but in a variety of diverse ways beyond the radiative effect of carbon dioxide. The CCSP assessments have been too conservative in recognizing the importance of these human climate forcings as they alter regional and global climate. These assessments have also not communicated the inability of the models to accurately forecast future regional climate on multi-decadal time scales since these other first-order human climate forcings are excluded. The forecasts, therefore, do not provide skill in quantifying the impact of different mitigation strategies on the actual climate response that would occur as a result of policy intervention with respect to only CO_2.

APPENDIX: The following is from the website Climate Science [http://climatesci.org/]; In the text below, when "Climate Science" is referred to, this refers to this website.

Documentation of IPCC WG1 Bias by Roger A. Pielke Sr. and Dallas Staley - Part I

Filed under: Climate Science Misconceptions, Climate Science Reporting — Roger Pielke Sr. @ 7:00 am

The 2007 Intergovernmental Panel on Climate Change (IPCC) Reports have the following stated goals:

"A comprehensive and rigourous picture of the global present state of knowledge of climate change"

and

"The Intergovernmental Panel on Climate Change (IPCC) has been established by WMO and UNEP to assess scientific, technical and socio-economic information relevant for the understanding of climate change, its potential impacts and options for adaptation and mitigation."

However, the IPCC WG 1 Chapter 3 report failed in this goal.

This weblog illustrates this defect using the example of their assessment of the multi-decadal land near-surface temperature trend data, where peer reviewed papers that conflicted with the robustness of the surface air temperature trends are ignored. Later Climate Science weblogs will document this issue with other climate issues.

Readers of Climate Science are invited to present other important peer reviewed papers that were available to the IPCC that were ignored in their assessment as further evidence to document IPCC bias.

To evaluate the IPCC's claim to be comprehensive, we cross-compared IPCC WG1 references on near-surface air temperature trends with the peer-reviewed citations that have been given in Climate Science. We selected only papers that appeared before about May 2006 so they were readily available to the IPCC Lead authors.

The comparison follows where the bold faced citations are in the IPCC WG1 Report:

I. ISSUES WITH THE ROBUSTNESS OF THE IPCC CONFIDENCE IN THE SURFACE TEMPERATURE RECORD

Chase, T.N., R.A. Pielke Sr., J.A. Knaff, T.G.F. Kittel, and J.L. Eastman, 2000: A comparison of regional trends in 1979-1997 depth-averaged tropospheric temperatures. Int. J. Climatology, 20, 503-518.

Davey, C.A., and R.A. Pielke Sr., 2005: Microclimate exposures of surface-based weather stations - implications for the assessment of long-term temperature trends. Bull. Amer. Meteor. Soc., Vol. 86, No. 4, 497–504.

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Hansen, J., L. Nazarenko, R. Ruedy, Mki. Sato, J. Willis, A. Del Genio, D. Koch, A. Lacis, K. Lo, S. Menon, T. Novakov, Ju. Perlwitz, G. Russell, G.A. Schmidt, and N.

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Hansen, J., Mki. Sato, R. Ruedy, L. Nazarenko, A. Lacis, G.A. Schmidt, G. Russell, I. Aleinov, M. Bauer, S. Bauer, N. Bell, B. Cairns, V. Canuto, M. Chandler, Y. Cheng, A. Del Genio, G. Faluvegi, E. Fleming, A. Friend, T. Hall, C. Jackman, M. Kelley, N. Kiang, D. Koch, J. Lean, J. Lerner, K. Lo, S. Menon, R. Miller, P. Minnis, T. Novakov, V. Oinas, Ja. Perlwitz, Ju. Perlwitz, D. Rind, A. Romanou, D. Shindell, P. Stone, S. Sun, N. Tausnev, D. Thresher, B. Wielicki, T. Wong, M. Yao, and S. Zhang 2005: Efficacy of climate forcings. J. Geophys. Res. 110, D18104, doi:10.1029/2005JD005776.

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If the papers were neglected because they were redundant, this would be no problem. However, they are ignored specifically because they conflict with the assessment that is presented in the IPCC WG1 Report, and the Lead Authors do not agree with that perspective!

That is hardly honoring the IPCC commitment to provide

> "A comprehensive and rigourous picture of the global present state of knowledge of climate change".

Moreover, the conflict of interest that was identified in the CCSP Report "Temperature Trends in the Lower Atmosphere: Steps for Understanding and Reconciling Differences" is perpetuated in the IPCC WG1 Chapter 3 Report [where the Editor of this CCSP Report, Tom Karl, is also Review Editor for the Chapter 3 of the 2007 IPCC WG1 Report].

These comments were made with respect to this CCSP Report

"The process for completing the CCSP Report excluded valid scientific perspectives under the charge of the Committee. The Editor of the Report systematically excluded a range of views on the issue of understanding and reconciling lower atmospheric temperature trends. The Executive Summary of the CCSP Report ignores critical scientific issues and makes unbalanced conclusions concerning our current understanding of temperature trends"?

"Future assessment Committees need to appoint members with a diversity of views and who do not have a significant conflict of interest with respect to their own work. Such Committees should be chaired by individuals committed to the presentation of a diversity of perspectives and unwilling to engage in strong-arm tactics to enforce a narrow perspective. Any such committee should be charged with summarizing all relevant literature, even if inconvenient, or which presents a view not held by certain members of the Committee."

The IPCC WG1 Chapter 3 Report process made the same mistakes and failed to provide an objective assessment. Indeed the selection of papers to present in the IPCC (as well as how the work of others that was cited was dismissed) had a clear conflict of interest as the following individuals cited their research prominently yet were also a Review Editor (Tom Karl), works for the Review Editor (Tom Peterson, Russ Vose, David Easterling), were Coordinating Lead Authors (Kevin Trenberth and Phil Jones), were Lead Authors (Dave Easterling and David Parker), or a Contributing Author (Russ Vose).

In fact, as stated above, the CCSP Report "Temperature Trends in the Lower Atmosphere: Steps for Understanding and Reconciling Differences", with its documented bias, was chaired by the same person as the Review Editor of the IPCC WG1 Chapter 3 Report (Tom Karl)! Regardless of his professional expertise, he is still overseeing an assessment which is evaluating his own research. There cannot be a clearer conflict of interest.

The IPCC WG1 Chapter 3 Report clearly cherrypicked information on the robustness of the land near-surface air temperature to bolster their advocacy of a particular perspective on the role of humans within the climate system. As a result, policymakers and the public have been given a false (or at best an incomplete) assessment of the multi-decadal global average near-surface air temperature trends.

Documentation Of IPCC WG1 Bias by Roger A. Pielke Sr. and Dallas Staley - Part II

Filed under: Climate Science Misconceptions, Climate Science Reporting — Roger Pielke Sr. @ 7:00 am

Among the findings of the 2005 National Research Council report

Radiative Forcing of Climate Change: Expanding the Concept and Addressing Uncertainties

are

I. "Determine the Importance of Regional Variation in Radiative Forcing

Regional variations in radiative forcing may have important regional and global climatic implications that are not resolved by the concept of global mean radiative forcing. Tropospheric aerosols and landscape changes have particularly heterogeneous forcings. To date, there have been only limited studies of regional radiative forcing and response. Indeed, it is not clear how best to diagnose a regional forcing and response in the observational record; regional forcings can lead to global climate responses, while global forcings can be associated with regional climate responses. Regional diabatic heating can also cause atmospheric teleconnections that influence regional climate thousands of kilometers away from the point of forcing. Improving societally relevant projections of regional climate impacts will require a better understanding of the magnitudes of regional forcings and the associated climate responses.

PRIORITY RECOMMENDATIONS:

Use climate records to investigate relationships between regional radiative forcing (e.g., land-use or aerosol changes) and climate response in the same region, other regions, and globally.

Quantify and compare climate responses from regional radiative forcings in different climate models and on different timescales (e.g., seasonal, interannual), and report results in climate change assessments.

II. Determine the Importance of Nonradiative Forcings

Several types of forcings—most notably aerosols, land-use and land-cover change, and modifications to biogeochemistry—impact the climate system in nonradiative ways, in particular by modifying the hydrological cycle and vegetation dynamics. Aerosols exert a forcing on the hydrological cycle by modifying cloud condensation nuclei, ice nuclei, precipitation efficiency, and the ratio between solar direct and diffuse radiation received. Other nonradiative forcings modify the biological components of the climate system by changing the fluxes of trace gases and heat between vegetation, soils, and the atmosphere and by modifying the amount and types of vegetation. No metrics for quantifying such nonradiative forcings have been accepted. Nonradiative forcings have eventual radiative impacts, so one option would be to quantify these radiative impacts. However, this approach may not convey appropriately the impacts of nonradiative forcings on societally relevant climate variables such as precipitation or ecosystem function. Any new metrics must also be able to characterize the regional structure in nonradiative forcing and climate response.

PRIORITY RECOMMENDATIONS:

Improve understanding and parameterizations of aerosol-cloud thermodynamic interactions and land-atmosphere interactions in climate models in order to quantify the impacts of these nonradiative forcings on both regional and global scales.

Develop improved land-use and land-cover classifications at high resolution for the past and present, as well as scenarios for the future."

Did the IPCC WG1 Statement for Policymakers adequately discuss these issues? The answer is NO. However, these topics are discussed in Chapter 7, where, for example, it is written,

"The consequences of changes in atmospheric heating from land changes at a regional scale are similar to those from ocean temperature changes such as from El Niño, potentially producing patterns of reduced or increased cloudiness and precipitation elsewhere to maintain global energy balance. Attempts have been made to find remote adjustments (e.g., Avissar and Werth, 2005). Such adjustments may occur in multiple ways, and are part of the dynamics of climate models. The locally warmer temperatures can lead to more rapid vertical decreases of atmospheric temperature so that at some level overlying temperature is lower and radiates less. The net effect of such compensations is that averages over larger areas or longer time scales commonly will give smaller estimates of change. Thus, such regional changes are better described by local and regional metrics or at larger scales by measures of change in spatial and temporal variability rather than simply in terms of a mean global quantity."

Why was not this conclusion headlined in the policy statement that was transmitted to the politicians?

Chapter 8 of the IPCC Report is much more poorly written on this subject

where while they write

"Evaluation of the land surface component in coupled models is severely limited by the lack of suitable observations. The terrestrial surface plays key climatic roles in influencing the partitioning of available energy between sensible and latent heat fluxes, determining whether water drains or remains available for evaporation, determining the surface albedo and whether snow melts or remains frozen, and influencing surface fluxes of carbon and momentum. Few of these can be evaluated at large spatial or long temporal scales. This section therefore evaluates those quantities for which some observational data exist"

they fail to identify the rich peer-reviewed literature on this subject but only provide a very limited presentation on this subject in the Chapter.

Indeed, while land processes are discussed in the Report, the focus is on its role in the carbon budget and in its effect on the global average radiative forcing.

To document missing papers, as with Part I (see and see) we have cross-referenced Climate Science with the IPCC WG1 Report on just one aspect of the above two topics (regional radiative forcing and nonradiative forcing), namely the role of land use change within the climate system.

This cross-referencing is given below where a bold face means that it appeared in the IPCC Report and the Chapter in which it appears is given. The IPCC Chapters referred to below have the titles

Chapter 2 Changes in Atmospheric Constituents and in Radiative Forcing

Chapter 6 Palaeoclimate

Chapter 7 Couplings Between Changes in the Climate System and Biogeochemistry

Chapter 8 Climate Models and their Evaluation

Chapter 10 Global Climate Projections

Chapter 11 Regional Climate Projections

II. ROLE OF LAND-USE CHANGE AS A MAJOR CLIMATE FORCING

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Here are several summary points from this assessment:

1. The 2005 NRC Report was only cited in one chapter (Chapter 2), and its recommendations are not considered in any of the following chapters.

2. None of the papers were cited in Chapter 9 which is entitled "Understanding and Attributing Climate Change". As documented in the papers listed above, the attribution of climate change cannot be accurately accomplished without including land surface processes, including land use change.

3. The important role of land surface processes in the IPCC chapters is presented in a sporadic fashion without the needed focused evaluation of its role, as recommended in the 2005 NRC

Report. The 2007 IPCC Report did not adequately honor the charge of the IPCC WG1 Report to provide "A comprehensive and rigourous picture of the global present state of knowledge of climate change".

Finally, if one suggests that the set of papers that were referenced in the IPCC report are a representative sample that cover the range of issues with the role of land surface processes (which Climate Science concludes is not the case), than refer us to the text in the IPCC report that addresses the issue of the importance of regional radiative and non-radiative climate forcings on the climate system. The IPCC Report fails on this much needed assessment of the role of humans in the climate system.

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