9-15-2010

Brief of Amici Curiae - Chamber of Commerce v EPA

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ORAL ARGUMENT NOT YET SCHEDULED

No. 09-1237

UNITED STATES COURT OF APPEALS

FOR THE DISTRICT OF COLUMBIA CIRCUIT

CHAMBER OF COMMERCE OF THE UNITED STATES OF AMERICA, et al.,

Petitioners,

v.

ENVIRONMENTAL PROTECTION AGENCY, et al.,

Respondents.

On Petition for Review of Final Action
of the United States Environmental Protection Agency

BRIEF OF *AMICI CURIAE* CLIMATE SCIENTISTS JAMES HANSEN, MARK JACOBSON, MICHAEL KLEEMAN, BENJAMIN SANTER, AND JAMES ZACHOS IN SUPPORT OF RESPONDENT ENVIRONMENTAL PROTECTION AGENCY

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CERTIFICATE AS TO PARTIES, RULINGS, AND RELATED CASES

Pursuant to Circuit Rule 28(a)(1), *amici* provide the following statements:

(A) PARTIES AND AMICI

All parties, intervenors, and *amici* appearing in this court are listed in the Petitioners' Opening Brief.

(B) RULING UNDER REVIEW

References to the ruling at issue appear in the Petitioners' Opening Brief.

(C) RELATED CASES

EPA's March 6, 2008, decision to deny California's waiver request was the subject of a petition for review in this Court in *California v. EPA*, Nos. 08-1178, 08-1179, 08-1180 (D.C. Cir. filed May 5, 2008, and dismissed Sept. 3, 2009). That proceeding was held in abeyance and ultimately dismissed before a decision on the merits following EPA's reconsideration of its original decision to deny California's waiver request.

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Other Authorities

* *Authorities upon which we chiefly rely are marked with asterisks.*

GLOSSARY OF ABBREVIATIONS

CO_2	Carbon Dioxide
EPA	United States Environmental Protection Agency
GHG	Greenhouse Gases
IPCC	Intergovernmental Panel on Climate Change
NAS	National Academy of Sciences
NASA	National Aeronautics and Space Administration
NO_x	Oxides of Nitrogen
PM	Particulate Matter
VOC	Volatile Organic Compound

INTEREST AND IDENTITIES OF *AMICI CURIAE*

Amici are leading climate scientists who study changes to the Earth's climate arising from both natural causes and from anthropogenic emissions of GHGs. They also investigate the impacts of climate change on California's air quality. *Amici* believe it is their scientific responsibility to provide this Court with accurate information about the nature and causes of climate change. Further, they believe that EPA's decision to grant California's request for a waiver is the right policy decision given current understanding of the likely impacts of climate change. Any policy statements here are the scientists' personal statements and not those of the organizations to which they belong. Dr. Kleeman joins only the Argument relating to air pollution, given his expertise.

James Hansen, Ph.D., has been head of NASA Goddard Institute for Space Studies since 1981 and is an Adjunct Professor of Earth and Environmental Sciences at Columbia University's Earth Institute. His research interests include radiative transfer in planetary atmospheres, development of global climate models, current climate trends from observational data, and projections of human impact on the climate. He is a member of the NAS and has served on the NAS/National Research Council's Committee on Climate Change. Having studied global climate perturbations since the 1970s, he has testified before policymakers and published many articles for the lay audience. He qualified as an expert in climatology,

including on the subject of climate tipping points, in *Green Mt. Chrysler Plymouth Dodge v. Crombie*, 508 F. Supp. 2d 295, 316-20 (D. Vt. 2007), involving the State of Vermont's adoption of California's program at issue here.

Mark Jacobson, Ph.D., is a Professor of Civil & Environmental Engineering, a Senior Fellow of the Woods Institute for the Environment, and Director and co-founder of the Atmosphere/Energy Program within the Department of Civil & Environmental Engineering at Stanford University. He is one of the leading scientists specializing in quantifying human health effects of CO_2 and constructing weather-climate models for investigating the effects of global climate change on urban air pollution. He discovered that the main component of soot pollution may be the second leading cause of global warming after CO_2 because soot darkens the Earth's surface and thereby decreases the amount of solar radiation the Earth can reflect back to space. He is the author of two textbooks, including *Fundamentals of Atmospheric Modeling* (2d ed. Cambridge University Press 2005), and nearly 100 peer-reviewed journal articles.

Michael Kleeman, Ph.D., is a Professor of Civil & Environmental Engineering at the University of California at Davis. He has authored more than 70 papers on urban and regional air pollution problems, with a focus on ozone and airborne particle pollution problems in California. His work established that, assuming current emissions continue, the Los Angeles and San Joaquin Valley

regions are likely to experience a significant increase in the number of days that are conducive to producing ozone concentrations in excess of California's one-hour ozone standard. Dr. Kleeman submitted to EPA a paper entitled, "Air Quality and Climate in California" (May 30, 2007), and testified before EPA in support of California's waiver request.

Benjamin Santer, Ph.D., is an atmospheric scientist at Lawrence Livermore National Laboratory, in its Program for Climate Model Diagnosis and Intercomparison. He specializes in analyzing climate data and identifying the causes of climate change. He pioneered the use of statistical techniques, which involve detailed statistical comparisons of modeled and observed climate change patterns. He and his colleagues successfully employed these "fingerprint" techniques to identify the effects of human-caused increases in GHG levels. He showed that the best statistical explanation of observed climate changes involves a large human contribution. He has contributed to all four IPCC reports. In 1998, the MacArthur Foundation awarded Dr. Santer a "genius" grant for research supporting the finding that human activity contributes to global warming.

James Zachos, Ph.D., is a Professor of Earth and Planetary Sciences at the University of California at Santa Cruz. His research interests include ocean acidification, the biological and chemical evolution of the oceans, and past climate change. He has authored over 100 peer-reviewed publications on Earth's past

climate, particularly the periods of extreme greenhouse warmth, as well as on Cenozoic cooling and the inception of Antarctic glaciation. He is a major contributor to understanding the impacts of rapid releases of carbon on ocean pH and carbonate chemistry. He has served on the NAS/National Research Council's Committee on Climate Change. He is a fellow of the American Geophysical Union and the Geological Society of America and a member of the Canadian Institute for Advanced Research, Earth System Evolution Program. Dr. Zachos also contributed to IPCC's Fourth Assessment Report.

Stephen Schneider, a prominent climatologist to whom the Court granted leave to file an *amicus* brief, recently died. His many scientific contributions to climate science were significant to EPA's waiver decision and are discussed here. Inez Fung, to whom the Court also gave leave, could not join the brief because she has been out of the country and unable to review the brief.

SUMMARY OF ARGUMENT

Scientists have long understood that human-caused GHG emissions would eventually warm the Earth. But the rapidity of recent climate change (and its impacts) has surprised many scientists. Some of these changes occurred much sooner than scientists had predicted. By the beginning of the 21st century, we observed rising global temperatures and sea levels, an increase in atmospheric moisture, loss of glaciers and sea ice, the acidification of the world's oceans, and

shifts in the distributions and abundances of plant and animal species. Evidence of these changes is so compelling that a consensus has developed in the scientific community: global warming is happening, and human activities significantly contribute to this warming.

Unless immediate reductions are made, the climate system may cross a threshold, triggering abrupt and major changes. These changes in the climate system could become unstoppable and, for the foreseeable future, difficult or impossible to reverse. Many plant and animal species may be unable to adapt to the rapid changes in climate we expect to experience under "business as usual" emissions scenarios.

EPA's waiver decision was based on ample scientific evidence that climate change disproportionately affects California. Air pollution problems are more severe in California than in the rest of the nation, and climate change has already exacerbated this problem. By increasing air pollution, anthropogenic CO_2 kills Californians at a rate 2.5 times higher than in the rest of the nation. In addition to worse air quality, California will continue to suffer disproportionate, and sometimes unique, climate change impacts. These impacts include increased risks of freshwater shortages and wildfires, which entail significant economic and human cost.

ARGUMENT

I. THERE IS SCIENTIFIC CONSENSUS THAT HUMAN ACTIVITIES HAVE CHANGED THE CLIMATE SYSTEM.

Human activities have significantly altered the chemical composition of Earth's atmosphere and its climate system. GHGs, which trap heat from the sun like a blanket, have increased in concentration in the atmosphere from fossil fuel combustion and deforestation. The increase has altered the Earth's ability to maintain the delicate balance of the energy it receives from the sun and radiates back into space.

As the IPCC has observed, "[w]arming of the climate system is unequivocal," and there is "very high confidence" (at least a 90% chance of being correct) that this warming is due to human activities.[1] The NAS, the Science Academies of eleven nations, and the first Synthesis and Assessment Product of the U.S. Climate Change Science Plan corroborate this fundamental conclusion.

Scientific evidence shows that the changes in many different aspects of Earth's climate system over the last century tell a coherent story: the impacts we

[1] IPCC, *Summary for Policymakers in* CLIMATE CHANGE 2007: THE PHYSICAL SCIENCE BASIS. CONTRIBUTION OF WORKING GROUP I TO THE FOURTH ASSESSMENT REPORT OF THE INTERGOVERNMENTAL PANEL ON CLIMATE CHANGE, at 1, 3, 22, 31 (S. Solomon et al. eds. 2007) ["*Summary*"]. Over three years, about one hundred scientists worked on the IPCC report, which underwent three rounds of peer review, and over a hundred governments approved. Statement of Stephen H. Schneider, Docket No. EPA-HQ-OAR-2006-0173 (June 5, 2007), at 33:10-33:14 ["Schneider Testimony"].

see today are consistent with scientific understanding of how the climate system should respond to human-induced GHG increases. The oceans and land surface have warmed, atmospheric moisture has increased, global sea level has risen, and rainfall and atmospheric air circulation patterns that affect water and heat distribution have changed. Collectively, these changes cannot be explained as the product of natural climate variability or a tilt in the Earth's axis alone. A large human contribution provides the best explanation of observed climate changes.

II. HUMAN-INDUCED CLIMATE SYSTEM CHANGE HAS WROUGHT UNPRECEDENTED HARMS.

Observable and well-documented impacts from the changes in our climate system imply that the current level of CO_2 has already taken the planet into a danger zone. The increased concentration of CO_2 in our atmosphere, likely the highest in at least a million years at 389 ppm, has raised global surface temperature by 1.4°F (0.8°C) in the last hundred years.[2] Since the late 1970s, the surface of the planet has warmed at a rate of roughly 0.3 to 0.4°F (0.15 to 0.2°C) per decade.[3] (See Figure 1.) While temperature fluctuates from year to year, over decades, the world is expected to continue to warm.

Consistent with this expected warming, two of the last ten years (2005 and

[2] *See* J. Hansen et al., NASA Goddard Institute for Space Studies, *Global Surface Temperature Change* (August 3, 2010); NASA, *Climate Change: Key Indicators*, http://climate.nasa.gov/keyIndicators.
[3] *Id.*

2010, unless La Niña conditions deepen in the remainder of this year) likely rank as the warmest years since 1880, when continuous temperature measurements began to be recorded.[4] More than a dozen nations experienced record high temperatures this summer. For the first time in the period of instrumental records, Moscow, Russia, experienced temperatures in excess of 100°F. Several regions of our nation also experienced unusual summertime heat waves this year. Notably, these record-breaking temperatures occurred during a period of minimum solar heating.

In the future, the once-in-a-lifetime heat wave is likely to become commonplace. These events pose significant health and welfare problems. As the 2010 Russian summer heat wave graphically demonstrated, heat destroys crops, triggers wildfires, exacerbates air pollution, and causes increased illness and death. The warming of the planet's surface has also wrought unprecedented changes in many aspects of the physical climate system and the environment:

- **Rising Sea Level:** Rising seas, brought about by melting icecaps and glaciers, as well as by thermal expansion of the warming oceans, are flooding low-lying areas. NASA reports that sea level has been rising at a rate of 3.26 millimeters per year based on measurements from 1993 to present. IPCC predicts a 0.6 meter rise in sea level by 2100 under a worst-case scenario that does not

[4] *Id.*

include the contributions from the accelerated flow of major ice sheets.[5] Some scientists predict a 2 meter rise in sea level by 2100 if present trends continue.[6]

- **Receding Alpine Glaciers:** Mountain glaciers, which are the source of freshwater for hundreds of millions of people, are receding worldwide. Today, Glacier National Park in Montana has twenty five glaciers larger than twenty five acres, down from 150 in 1850. Scientists predict that there may be no glaciers there by 2030.[7]

- **Massive Ice Loss:** During the 2007 melt season, the extent of Arctic sea ice (frozen ocean water) declined precipitously to its lowest level since satellite measurements began in 1979.[8] Arctic sea ice plays an important role in stabilizing the global climate, because it reflects back to space much of the solar radiation that the region receives. Beginning in late 2000, the Jakobshavn Isbrae Glacier, which has a major influence over the mass of the Greenland ice sheet, lost significant amounts of ice.[9] In August of this year, an enormous iceberg roughly ninety-seven

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[5] *Summary* at 13-14.
[6] *E.g.*, M. Vermeer & S. Rahmstorf, *Global Sea Level Linked to Global Temperature*, 106 PROC. NATL. ACAD. SCI. 21527, 21531 (2009).
[7] U.S. Geological Survey, *Melting Glaciers Signal Change in National Parks* (June 24, 2010), http://www.nwrc.usgs.gov/world/content/land5.html.
[8] National Snow and Ice Data Center, Press Release, *Arctic Sea Ice Shatters All Previous Record Lows* (Oct. 1, 2007), http://nsidc.org/news/press/2007_seaiceminimum/20071001_pressrelease.html.
[9] *Summary* at 368.

square miles in size, broke off from Greenland.[10] Nine Antarctic ice shelves have also collapsed into ice bergs in the last fifty years, six of them since 1996. An ice shelf roughly the size of Rhode Island collapsed in 2002, and an ice bridge collapsed in 2009, leaving an ice shelf the size of Jamaica on the brink of breaking apart.[11]

- **Ocean Acidification:** The oceans have absorbed about one-third of the CO_2 emitted from human activity over the past two centuries. This capacity has slowed global warming, but at a cost: the added CO_2 has caused the oceans' average surface pH to drop. As atmospheric concentrations of CO_2 increase, the oceans are expected to become more acidic, though the rate of CO_2 uptake by the oceans will slow down over time, with more CO_2 remaining in the atmosphere. The upper oceans may experience significant environmental damage if ocean acidification affects the structural integrity and survival of aquatic calcifying organisms (such as corals and shellfish). Coral reefs are major habitats for ocean fauna, and calcifying algae and plankton are key components of the marine food chain. Their depletion would substantially reduce fish and marine mammal populations. About 55 million years ago, the ocean absorbed a large amount of

[10] NASA Earth Observatory, *Ice Island Calves Off Petermann Glacier* (Aug. 2010), http://earthobservatory.nasa.gov/NaturalHazards/view.php?id=45112&src=eorss-nh.

[11] NASA Earth Observatory, *Wilkins Ice Bridge Collapse* (April 2009), http://earthobservatory.nasa.gov/IOTD/view.php?id=37806.

CO_2, although at a rate ten times slower. Yet this acidification event likely contributed to the mass extinction of calcifying organisms at the seafloor.[12] It took over 100,000 years for the ocean to regain its normal alkalinity.[13]

- **Ecosystem Disruption:** Scientists have observed earlier occurrences of spring events in terrestrial ecosystems and geographical shifts in plant and animal ranges (*e.g.*, affecting where wheat can grow, expansion of deserts, and the availability of food supplies to animals). Species extinction rates have also increased compared to the pre-industrial rate. Mediterranean-like ecosystems, such as those in California, may be among the most impacted by climate change. Moreover, human-induced climate changes have exacerbated the existing pressures on the ecosystem from land use, resource extraction, and pollution.

- **Extreme Weather Events:** While scientists cannot confidently attribute any specific extreme events to human-induced climate change, they can make informed statements about influences of such change on the likelihood of extreme events. For example, there is compelling scientific evidence that warming of the planet will increase not only the risk of heat waves but heavy rainfall events. The recent flooding in Pakistan left an estimated 6.5 million people in need of

[12] James C. Zachos et al., *Rapid Acidification of the Ocean During the Paleocene-Eocene Thermal Maximum*, 308 SCIENCE 1611 (2005).
[13] *Id.*

shelter and other necessities and 1,600 dead.[14] This rainfall behavior is consistent with our understanding of the likely impacts of global climate change.

III. IT IS CRITICAL TO REDUCE CO_2 NOW BECAUSE WE ARE DANGEROUSLY NEAR A TIPPING POINT, WHERE CLIMATE CHANGES ARE LIKELY TO BECOME ABRUPT AND UNCONTROLLABLE.

Evidence points to a critical need for even more stringent GHGs reductions than previously thought necessary. Immediate reductions are necessary to prevent further warming and irreversible destabilization of the climate system, which can occur when GHG concentrations reach an as yet unknown, critical level.

A. We Risk Reaching a Tippling Point, Where Abrupt and Irreversible Changes Can Occur.

In a number of cases, observed changes in climate have been larger than computer models projected. A prime example is Arctic sea ice extent, which has retreated more rapidly than predicted. Because of such differences – which arise in part because current models do not account for all of the real-world amplifying feedbacks – it is instructive to augment computer model studies with examination of the changes that have occurred throughout Earth's climate history.

Studies of paleoclimate data confirm that our climate is indeed a sensitive system and provide evidence that major climate change can occur in decades. This

[14] Nathaniel Gronewold & Climatewire, *Is the Flooding in Pakistan a Climate Change Disaster?,* SCI. AM. (Aug. 18, 2010), http://www.scientificamerican.com/article.cfm?id=is-the-flooding-in-pakist.

sensitivity is worrisome, particularly because human activities are changing the chemical composition of the atmosphere not on slow, geological timescales, but on timescales of only a few centuries.

Paleoclimate records tell us that there are tipping points, where only a moderate increase in temperature triggers other mechanisms (such as the release of arctic methane or the destabilization of ice sheets), which in turn can cause abrupt and major changes in climate. There are numerous instances in the geologic record with sea level rise of four to five meters in a century or less, associated with climate forcings much smaller than the human-made forcing expected this century.

If we reach a tipping point, major changes in the climate system could become unstoppable and, for the foreseeable future, difficult or impossible to reverse. Changes not only could include a sudden sea level rise from a cataclysmic collapse of ice sheets, but also extermination of a substantial fraction of the animal and plant species and major climate disruptions. Life on Earth, especially humanbeings, would find it difficult to adapt in so short a timeframe.

Although such "points of no return" are difficult to define because the Earth's system does not respond linearly, we can no longer wait and see. If fossil fuel use continues to increase in a business as usual scenario, scientists expect an increase of possibly even more than 9°F (5°C) by the end of this century.[15]

[15] IPCC Fourth Assessment Report, *Climate Change 2007: Synthesis Report*

Without change in our GHG emissions, we are inevitably heading toward a tipping point.

B. Even Without Any Added CO_2, the Earth Will Continue to Warm from Historic Emissions.

Even if we stop emitting GHGs now, additional warming will occur because of past emissions. To date, only half of the eventual surface warming from historic emissions of GHGs has been realized. This is because two fundamental properties of the climate system have partially delayed the full impact of the current level of GHGs.

The first property is thermal inertia of the oceans. Because of their immense mass, oceans warm slowly in response to atmospheric CO_2. But even if atmospheric CO_2 levels remain the same, oceans will continue to warm and expand. The second property involves changes within the climate system that slowly amplify the climate's response to GHGs. These slow feedback mechanisms include an expansion in the area covered by vegetation and the increased surface melting (and eventual disintegration) of the major ice sheets, which cause darkening of the Earth's surface and increase absorption of solar energy.

(2007), at Figure SPM.5, http://www.ipcc.ch/publications_and_data/ar4/syr/en/spms3.html.

Even with the delay in the climate's response, the Earth is now within 1.8°F (1°C) of its highest temperature in the past million years.[16] It is thus critical to reduce GHG emissions now to stop adding to the warming in the pipeline.

IV. CALIFORNIA SUFFERS DISPROPORTIONATELY FROM CLIMATE CHANGE IMPACTS IN AIR POLLUTION AND HYDROLOGY

Air pollution caused by human activities impacts California disproportionately. Eight of the ten cities and seventeen of the twenty-four counties with the highest ozone concentrations in the nation are in California.[17] California's worst and persistent ozone problems in the Los Angeles Basin and San Joaquin Valley are caused by local conditions – its topography (air basins bordered by mountain ranges), climate (warm temperatures and clear skies), and significant emissions from sources such as vehicles.[18] In Los Angeles, for example, fifteen million people live in a very confined air basin, with the necessary ingredients for ozone formation – warm temperatures, sunlight and emissions of VOCs and NOx.[19]

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[16] Declaration of James E. Hansen, at ¶ 43, *Green Mt. Chrysler Plymouth Dodge v. Crombie*, 508 F. Supp. 2d 295 (D. Vt. 2007), *available at* 2006 WL 4761053 (Aug. 14, 2006).
[17] Am. Lung Assn., *State of the Air*, at 11 (2010), http://www.stateoftheair.org/2010/key-findings/SOTA2010.pdf.
[18] *See* Michael J. Kleeman et al., *Climate Change Impact on Air Quality in California*, FINAL REPORT TO THE CALIFORNIA AIR RESOURCES BOARD (2010) ["CARB FINAL REPORT"].
[19] *Id.* at 16-17.

California's air quality problems will worsen with climate change leading to disproportionate impacts for residents, even as reductions are made to VOC and NOx emissions. Statewide temperatures are expected to increase 3.6° to 12.6°F (2-7°C) this century,[20] and analysis consistently shows that increasing temperatures lead to the production of more ozone in California's air basins.[21] There is evidence from a multiyear study that California suffers disproportionately more deaths (2.5 times) than the nation as a whole due to higher ozone resulting from warmer temperatures and higher water vapor associated with global warming induced by CO_2 emissions.[22] High temperatures and water vapor increase ozone pollution the most where the concentrations are already high, as they are in California.

Quite apart from impacts of global GHG emissions, the first study of *local* impacts from GHG emissions provides evidence that these emissions can cause *local* health impacts in California. Local emissions of CO_2 accumulate over cities before spreading, and such emissions have the potential to increase local air

[20] John Abatzoglou et al., *A Primer on Global Climate Change and Its Likely Impacts in* CLIMATE CHANGE, at 56 (DiMento & Doughman eds., MIT Press 2007).
[21] Michael J. Kleeman et al., CARB Final Report.
[22] Mark Z. Jacobson, Testimony for Hearing on *Healthy Planet, Healthy People: Global Warming and Public Health*, Select Committee on Energy Independence and Global Warming, U.S. House of Representatives (April 9, 2008), at 2–3, http://www.stanford.edu/group/efmh/jacobson/Testimony0408%202.pdf. The findings are based on the paper, Mark Z. Jacobson, *On the causal link between carbon dioxide and air pollution mortality*, GEOPHYS. RES. LETT., Vol. 35 (2008).

pollution, particularly ozone.[23] California is therefore right to be concerned about emissions from motor vehicles within the state because they cause air quality problems in California before causing global problems.

Climate change disturbances are also increasing PM pollution in California through the modification of wildfire patterns. California lacks precipitation in the summer, and warmer summers are particularly conducive to expansion of wildfires.[24] Wildfires are associated with serious air pollution episodes arising from the smoke plumes, a dangerous condition when fires occur close to populated areas, as they have in recent years.

Moreover, California suffers the largest socio-economic and environmental impact from climate-related changes that have occurred in the hydrology of the western U.S. since 1950. Those changes include a trend toward more winter precipitation falling as rain instead of snow, earlier snow melt, and a resulting increase in spring river flow.[25] Scenarios based on scientific studies foretell "water shortages, lack of storage capability to meet seasonally changing river flow, [and] transfers of water from agricultural to urban uses."[26] Indeed, scientists concluded

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[23] Mark Z. Jacobson, *Enhancement of Local Air Pollution by Urban CO_2 Domes*, 44 ENVTL. SCI. TECHNOL. 2497 (2010).
[24] Schneider Testimony at 38:1-38:14.
[25] Tim Barnett et al., *Human-Induced Changes in the Hydrology of the Western United States*, 319 SCIENCE 1080 (2008).
[26] *Id.* at 1082.

that they had "every reason to believe" those projections.[27] Thus, local causal factors, in conjunction with climate change, lead to air pollution and water infrastructure problems in California.

CONCLUSION

Reductions in GHG emissions must be made immediately before it is too late to stop runaway impacts of global warming. California, a pioneer in many successful air quality efforts, should be permitted to continue in that role, pointing the way for the country and the world to reclaim a safe atmosphere.

Respectfully submitted,

Dated: September 15, 2009

/s/ Helen H. Kang
Helen H. Kang
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James Hansen, Mark Jacobson,
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[27] *Id.*

CERTIFICATE OF COMPLIANCE

Pursuant to Federal Rule of Appellate Procedure 32(a)(7)(C) and D.C. Circuit Rule 32-1, counsel of record for *Amici Curiae* certifies that the foregoing brief is proportionately spaced, has a typeface of 14 points and contains 3,907 words, excluding the cover page, Table of Content, Table of Authorities, and the Glossary.

Respectfully submitted,

Dated: September 15, 2009

/s/ Helen H. Kang
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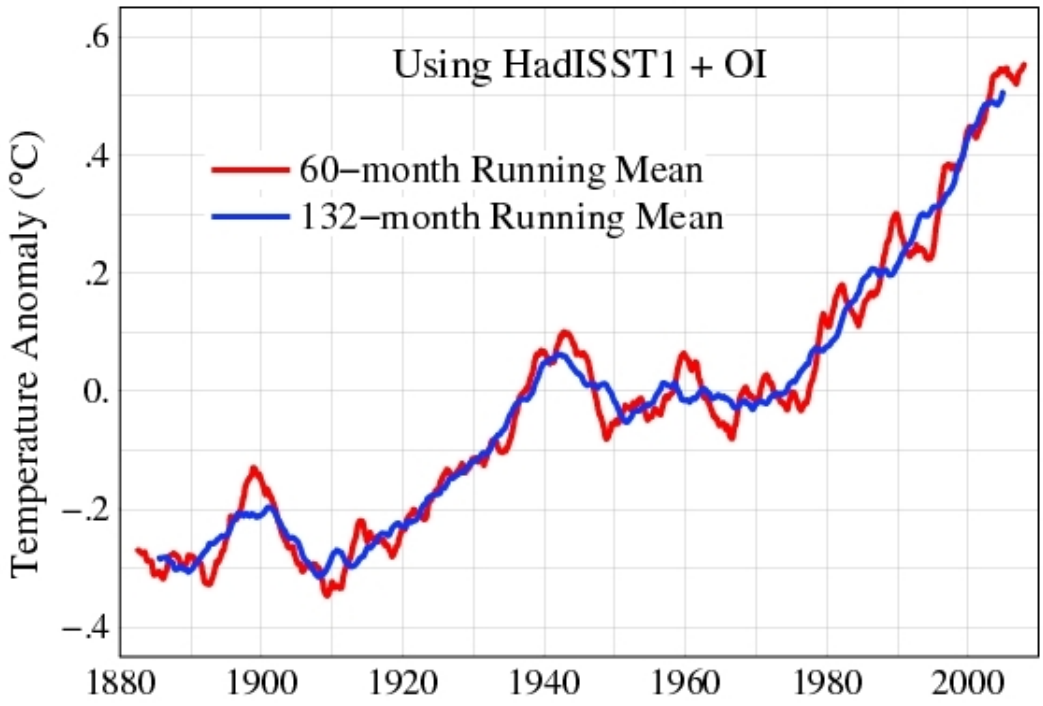
FIGURE 1

Figure 1
Graph of Global Temperature Changes 1880 to Present
NASA Goddard Institute for Space Studies*



* NASA GISS, August, 2010; Graphic based on the UK Met Office Hadley Centre Sea Surface Temperature Data ("HadISST1") plus data ("OI") from Reynolds, R.W., et. al., Journal of Climatology, Vol. 15, p. 1609, 2002 and Vol. 23, p. 152, 2010.

CERTIFICATE OF SERVICE

I hereby certify that on September 15, 2010 I electronically filed the foregoing with the Clerk of the Court by using the CM/ECF system. Parties to the case who are registered CM/ECF users were served by receipt of electronic notification through the Court's CM/EFC system.

In addition, I certify that the following parties were served by first class mail, postage prepaid:

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