COURT FILE NUMBER	KB-RG-0848 of 2023
COURT OF KING'S BENCH FOR SASKATCHEWAN	
JUDICIAL CENTRE	REGINA
APPLICANTS	SABRINA DYKSTRA, JILL FORRESTER, RYAN HEISE, KAYLA HOPKINS, LYNN OLIPHANT, HAROLD PEXA, AMY SNIDER, and CLIMATE JUSTICE SASKATOON ORGANIZATION INC.
RESPONDENTS	SASKATCHEWAN POWER CORPORATION, CROWN INVESTMENTS CORPORATION OF SASKATCHEWAN, and THE GOVERNMENT OF SASKATCHEWAN

AFFIDAVIT

AFFIDAVIT OF EXPERT WITNESS DR. JAMES E. HANSEN

I, DR. JAMES E. HANSEN, of Ottsville, Pennsylvania, in the United States of America, affirm:

1. I provide this opinion to the Court in my capacity as a climate scientist.

2. I provide this opinion evidence contained herein in an objective and non-partisan manner. My opinion evidence provided herein is related only to matters within my areas of expertise.

3. I am a United States citizen and resident of the US State of Pennsylvania.

4. I have a bachelor's degree (highest distinction in physics and mathematics), a master's degree in astronomy, and Ph. D. in physics from the University of Iowa. Attached to this affidavit as **Exhibit A** is my Curriculum Vitae, which describes my qualifications in greater detail.

5. In my early research I used telescopic observations of Venus to extract detailed information on the physical properties of the cloud and haze particles that veil that planet. However, commencing in the mid-1970s, I turned my focus to research and simulations of Earth's climate, for the purpose of understanding the human impact on global climate. I have also expended considerable time in recent years in efforts aimed at drawing attention to the danger of passing climate tipping points, producing irreversible climate impacts that would yield a different planet from the one on which civilization developed, and to steps that are needed to stabilize climate, with a cleaner atmosphere and ocean.

6. From 1972-1981, I served as a staff scientist at the Goddard Institute for Space Studies (GISS) and as Manager of GISS Planetary and Climate Programs, and then, from 1981-2013, I served as Director of the NASA Goddard Institute for Space Studies. I have also been a member of the National Academy of Sciences, since 1995. Since 2013, I have served as Director of the Program on Climate Science, Awareness and Solutions at Columbia University's Earth Institute.

7. I have testified before the United States Senate and House of Representatives on many occasions, and in court on several occasions, in support of efforts to reduce reliance on carbon intense energy from fossil fuels and rapidly transition to carbon-free energy.

8. Also toward that end, I am a plaintiff in Climate Protection and Restoration Initiative, et. al, vs United States Environmental Protection Agency et al. No. 6:22-cv-01772-MK (District of Oregon, Eugene) a case demanding that the US EPA commence rulemaking to phase out greenhouse gas pollution stemming from fossil fuel production, processing, distribution, use and disposal, including legacy emissions.

9. My purpose here is to support Applicants' central assertions that a stable climate requires that we quickly and dramatically reduce emissions from human activity, and that the fundamental interests of Saskatchewan residents – especially those living close to the land (indigenous communities, farmers, et al), along with future generations – are implicated by Respondents' ongoing permitting of development and expansion of unabated fossil-fuel based energy generation.

10. Indeed, it is the entire planet that is at risk, though because climate extremes will only compound with Earth's increasing energy imbalance as we continue to burn fossil fuels at high rates, the worst is yet to come for young people, future generations, and persons living close to the land.

11. My view as to the entirely unacceptable danger presented by additional fossil fuel development is based in part on my work in four far-reaching studies. My co-authors in these included top researchers in the areas of climate science and economics. I hereby, by reference, incorporate into this affidavit the analyses and conclusions of those studies. They are:

    - *"Dangerous Climate Change": Required Reduction of Carbon Emissions to Protect Young People, Future Generations and Nature*,[1]

    - *Ice Melt, Sea Level Rise and Superstorms: Evidence from Paleoclimate Data, Climate, and Modeling, and Modern Observations that 2°C Global Warming is Highly Dangerous*,[2]

[1] Published by PLOS One (Dec. 3, 2013) and available at http://journals.plos.org/plosone/article?id=10.1371/journal.pone.0081648.
[2] Published by Atmospheric Chemistry and Physics (March 22, 2016) and available at http://www.atmos-chem-phys.net/16/3761/2016/.

- *Young People's Burden: Requirement of Negative CO_2 Emissions*, and[3]
- *Global Warming in the Pipeline.*[4]

12. As an initial matter, there simply is no question that continued fossil fuel emissions have driven GHG concentrations to levels unprecedented in the modern era. It is also indisputable that those elevated concentrations have raised ambient temperatures around the planet. CO_2 functions as the control knob for global temperature. Its atmospheric concentration has risen now to 419 ppm. Atmospheric CO_2 rise, in recent decades, has been dramatic and, seemingly, inexorable, as illustrated in Figure 1 – presenting an update of the famous "Keeling curve," the amount of atmospheric CO_2 measured in pristine Pacific Ocean air.[5] In fact, not only is atmospheric CO_2 continuing to increase, it's annual rate of growth, which averaged less than 1 ppm per year when Keeling began his measurements in the late 1950s, now averages now more than 2ppm per year.

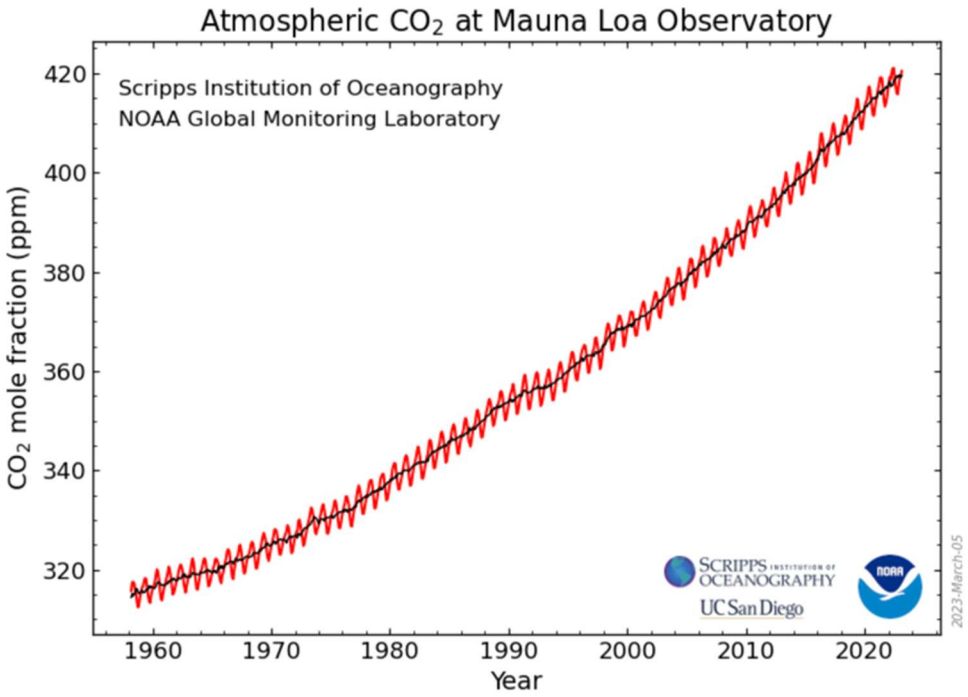


Fig. 1: Atmospheric CO_2 amount measured in the early decades by Charles David Keeling and in recent years by NOAA.

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[3] Published by Earth System Dynamics (July 18, 2017) and available at https://www.earth-syst-dynam.net/8/577/2017/.

[4] Advance publication available at https://arxiv.org/abs/2212.04474.

[5] "Due to the eruption of the Mauna Loa Volcano, measurements from Mauna Loa Observatory were suspended as of Nov. 29. Observations starting in December 2022 are from a site at the Maunakea Observatories, approximately 21 miles north of the Mauna Loa Observatory." NOAA, Global Monitoring Laboratory, Trends in Atmospheric Carbon Dioxide, at https://gml.noaa.gov/ccgg/trends/mlo.html.

13. In *Dangerous Climate Change*, denoted *supra* in the text accompanying footnote #1, my colleagues and I established that continued fossil fuel burning up to even 2°C above the preindustrial level[6] likely would cause large climate change with disastrous and irreversible consequences. We attempted to describe the practical impacts of continued global warming. If ice sheets are allowed to become unstable, shorelines will not be stable at any time in the foreseeable future, instead being in continual retreat for centuries, a consequence of the slow response time of ocean temperature and ice sheet dynamics. Economic and social implications could be devastating. Because more than half of the largest cities in the world are located on coastlines and the population of coastal regions today continues to grow rapidly, the number of refugees would dwarf anything the world has ever experienced. It is not difficult to imagine that the world would become nearly ungovernable.

14. Rapid shifting of climate zones, already well underway, will be a major contributor to species extinction if global warming continues. Coral reefs, the "rainforests of the ocean," harboring millions of species, are threatened by the combination of a warming ocean, ocean acidification, rising sea level, and other human-caused stresses. The subtropics in summer and the tropics in all seasons will become dangerously hot, such that it will be difficult to work outdoors -- a large impact that would render large parts of the world less habitable.

15. Accordingly, we determined that action to rapidly phase out CO_2 emissions and draw down excess atmospheric carbon is urgently needed so as to reduce the atmospheric CO_2 concentration from present levels to no more than 350 ppm, restore Earth's energy balance, and stabilize long-term global warming to no more than 1°C above preindustrial temperatures.

16. In *Ice Melt, Sea Level Rise and Superstorms*, denoted *supra* in the text accompanying footnote #2, we conclude that if CO_2 emissions are allowed such that energy is continuously pumped at a high rate into the ocean, then multi-meter sea level rise will become practically unavoidable, with consequences that may threaten the very fabric of civilization. Sea level was reasonably stable for the past several thousand years, prior to the industrial era. Preindustrial sea level changes were less than one meter per millennium, which is less than 10 cm (4 inches) in a century. But the climate system is now out of equilibrium. In such a system, in which the ocean and ice sheets have great inertia but are beginning to change, the existence of amplifying feedbacks presents a situation of great concern. There is a real, imminent danger that we are handing young people and future generations a climate system that is practically out of their control.

[6] We are already >1.0°C above the preindustrial temperature.

17. To illustrate the danger of a 2°C target – the upper temperature limit adopted after only cursory analysis by the 15th Conference of the Parties of the United Nations Framework Convention on Climate Change) – we need to realize that this level of global warming implies eventual sea level rise of at least 6 meters (20 feet). Scenarios with this level of warming are typified by assessments that incorporate only fast feedbacks; in reality, eventual warming of 3-4°C from the added effects of slow feedbacks would result. That would make Earth at least as warm as in the Pliocene, suggesting a sea level rise of 15-25 m. Figure 2 shows areas that would be under water for 6 and 25 m sea level rises. These areas include a majority of the world's largest cities and a total population of hundreds of millions of people.

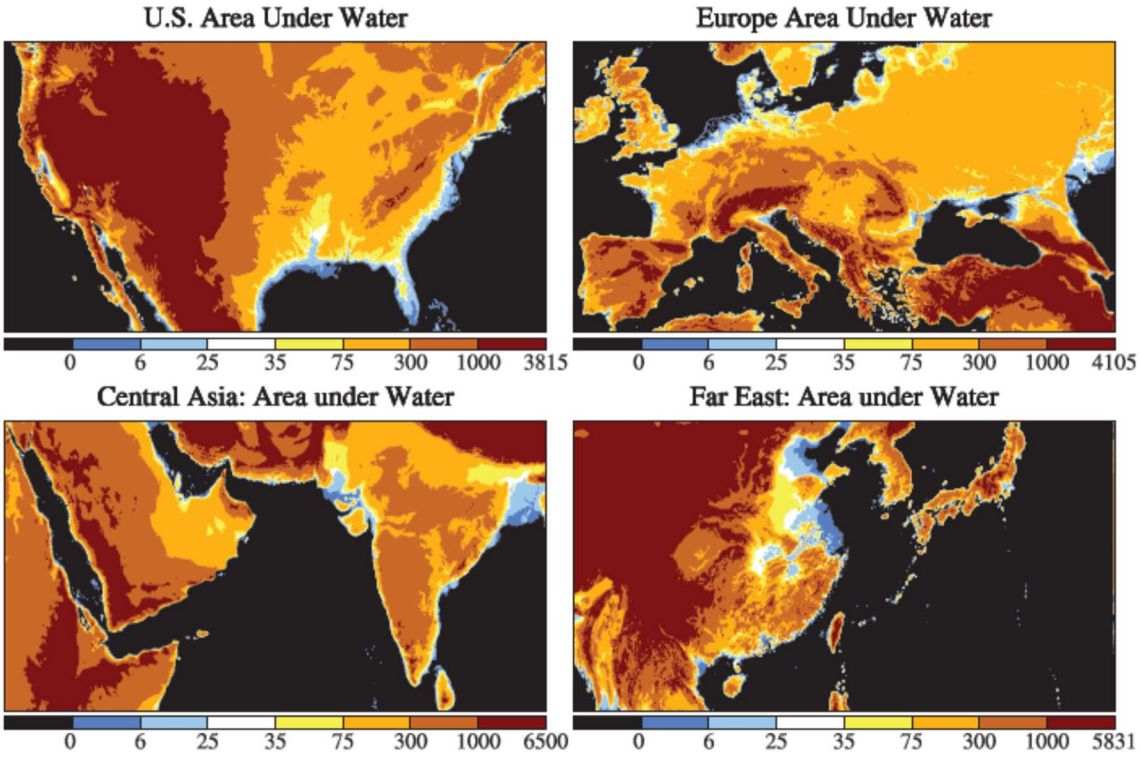


Fig. 2. Areas (light and dark blue) that nominally would be under water for 6 and 25 m sea level rise.

18. In our 2013 *Dangerous Climate Change* paper we concluded that the combination of rapid emissions reduction and storage of carbon in the soil and biosphere via reforestation and improved forestry and agricultural practices could keep global temperature close to the Holocene range. But continued high emissions and continued global warming have worsened that picture. Global temperature relative to preindustrial time now exceeds 1°C, and fossil fuel emissions continued to increase after 2013, rather than decline. Global temperature is well above the range that has occurred in the Holocene, the last 11,700 years.

19. In our 2017 study, *Young People's Burden*, my colleagues and I further show that continued high emissions and associated rapid warming of the past four decades had raised global temperature

to a level matching best estimates for the level of warmth in the Eemian period. The Eemian, the most recent interglacial period prior to the Holocene, lasted from about 130,000 to 116,000 years before present. Global temperature in that period, at about +1°C relative to 1880-1920, was only moderately warmer than the Holocene, and yet sea level reached heights as great as 6-9 meters (20-30 feet) above present.

20. During the past several thousand years during which civilization evolved, cities were built along coastlines at or just above sea level with enormous investment. This has been possible because of the stable sea level. Similarly, agricultural regions and other settlements relate to relatively stable Holocene climate patterns. Our coastal cities, agricultural food production upon which we depend, and other environment-dependent livelihoods are placed at risk if we allow warming to continue. Because of the inertia of ocean temperature, i.e., the long period required to cool once it has warmed, we stand to lock in highly undesirable consequences for young people and future generations if we let warming reach the extraordinary level +2°C, exceeding Eemian warmth.

21. Securing a habitable climate system, therefore, now requires not only a rapid phase down of fossil fuel emissions, but also "negative emissions," i.e., extraction of CO_2 from the air, as we discuss in the *Young People's Burden* study. Continued high fossil fuel emissions would place a burden on young people to undertake massive technological CO_2 extraction, if they are to limit climate change and its consequences. But because estimated costs of such extraction are in the range of tens to hundreds of trillion U.S. dollars this century, this raises intractable questions about their feasibility. At minimum, I conclude that continued high fossil fuel emissions sentences young people to a massive and possibly implausible cleanup, or growing deleterious climate impacts, or both.

22. Indeed, our most recent study, *Global Warming in the Pipeline* – now in prepublication, but available for public review – establishes that much additional warming is "in the pipeline." That is, global warming likely to emerge from today's GHG forcing alone is much higher than most prior estimates. Indeed, we conclude in *Pipeline* that global warming in the four decades commencing 2010 may far exceed the warming of the prior 40 years. This understanding, in my view, demands far higher attention by decision makers to the climate crisis, one that far-more effectively addresses both continuing and new emissions sources, as well as legacy emissions. In brief, the era of impunity for major polluters, as well as for governments that induce or otherwise permit additional fossil fuel exploitation, must come to a rapid conclusion.

23. With respect to the Government of Saskatchewan, then, as well as the SaskPower and Crown Investments Corporations, their relevant duty, as Applicants here have urged, is plain – if, that is, we are to preserve a climate system conducive to young people and future generations. These decision makers, no less than other authorities, must see to it, at a minimum, that reliance on fossil

fuels is phased out as rapidly as feasible (unless corresponding emissions are fully and effectively abated).

24. I conclude, therefore, that Respondents' recent actions expanding development of fossil-fuel power at Moose Jaw and Lanigan veers sharply in the wrong direction. The Applicants' demands, therefore, that Saskatchewan instead develop, transition, and adhere to a net zero energy pathway would amount to an important step forward. In light of our current substantial overshoot of the safe level of atmospheric CO_2, far more is required. Still, the actions demanded by the Applicants are necessary and warranted, even if long overdue.

I, James E. Hansen, declare under penalty of perjury under the laws of the United States that the foregoing constitutes my true and correct written testimony in this matter. I further declare under the penalty of perjury that the foregoing is true and correct. 28 USC 1746.

SWORN (OR AFFIRMED) BEFORE ME
Remotely via electronic means
this _____17th _____day of March,
2023 .

Commissioner for Oaths
for Saskatchewan, being a solicitor

James E Hansen

Dr. James E. Hansen

James E. Hansen

Columbia University Earth Institute, Climate Science, Awareness and Solutions
Interchurch Building, 475 Riverside Drive, Room 401-O, New York, NY 10115
jimehansen@gmail.com

1-paragraph bio/introduction:

Dr. James Hansen, formerly Director of the NASA Goddard Institute for Space Studies, is an Adjunct Professor at Columbia University's Earth Institute, where he directs a program in Climate Science, Awareness and Solutions. Dr. Hansen is best known for his testimony on climate change in the 1980s that helped raise awareness of global warming. He is a member of the U.S. National Academy of Sciences and has received numerous awards including the Sophie and Blue Planet Prizes. Dr. Hansen is recognized for speaking truth to power and for outlining actions needed to protect the future of young people and all species on the planet.

1-long-paragraph bio:

Dr. James Hansen, formerly Director of the NASA Goddard Institute for Space Studies, is an Adjunct Professor at Columbia University's Earth Institute, where he directs a program in Climate Science, Awareness and Solutions. He was trained in physics and astronomy in the space science program of Dr. James Van Allen at the University of Iowa. His early research on the clouds of Venus helped identify their composition as sulfuric acid. Since the late 1970s, he has focused his research on Earth's climate, especially human-made climate change. Dr. Hansen is best known for his testimony on climate change to congressional committees in the 1980s that helped raise broad awareness of the global warming issue. He was elected to the National Academy of Sciences in 1995 and was designated by Time Magazine in 2006 as one of the 100 most influential people on Earth. He has received numerous awards including the Carl-Gustaf Rossby and Roger Revelle Research Medals, the Sophie Prize and the Blue Planet Prize. Dr. Hansen is recognized for speaking truth to power, for identifying ineffectual policies as greenwash, and for outlining actions that the public must take to protect the future of young people and other life on our planet.

3-paragraph bio:

Dr. James Hansen, formerly Director of the NASA Goddard Institute for Space Studies, is an Adjunct Professor at Columbia University's Earth Institute, where he directs a program in Climate Science, Awareness and Solutions. He was trained in physics and astronomy in the space science program of Dr. James Van Allen at the University of Iowa, receiving a bachelor's degree with highest distinction in physics and mathematics, master's degree in astronomy, and Ph. D. in physics in 1967. Dr. Hansen was a visiting student, at the Institute of Astrophysics, University of Kyoto and Dept. of Astronomy, Tokyo University, Japan from 1965-1966. He received his Ph.D. in physics from the University of Iowa in 1967. Except for 1969, when he was an NSF post-doctoral scientist at Leiden Observatory under Prof. H.C. van de Hulst, he has spent his post-doctoral career at NASA GISS.

In his early research Dr. Hansen used telescopic observations of Venus to extract detailed information on the physical properties of the cloud and haze particles that veil Venus. Since the mid-1970s, Dr. Hansen has focused on studies and computer simulations of the Earth's climate, for the purpose of understanding the human impact on global climate. He is best known for his testimony on climate change to Congress in the 1980s that helped raise broad awareness of the global warming issue. In recent years Dr. Hansen has drawn attention to the danger of passing climate tipping points, producing irreversible climate impacts that would yield a different planet from the one on which civilization developed. Dr. Hansen disputes the contention, of fossil fuel interests and governments that support them, that it is an almost god-given fact that all fossil fuels must be burned with their combustion products discharged into the atmosphere. Instead Dr. Hansen has outlined steps that are needed to stabilize climate, with a cleaner atmosphere and ocean, and he emphasizes the need for the public to influence government and industry policies.

Dr. Hansen was elected to the National Academy of Sciences in 1995 and, in 2001, received the Heinz Award for environment and the American Geophysical Union's Roger Revelle Medal. Dr. Hansen received the World Wildlife Federation's Conservation Medal from the Duke of Edinburgh in 2006 and was designated by Time Magazine as one of the world's 100 most influential people in 2006. In 2007 Dr. Hansen won the Dan David Prize in the field of Quest for Energy, the Leo Szilard Award of the American Physical Society for Use of Physics for the Benefit of Society, and the American Association for the Advancement of Science Award for Scientific Freedom and Responsibility. In 2008, he won the Common Wealth Award for Distinguished Service in Science and was also awarded both the Ohio State University's Bownocker Medal and the Desert Research Institute's Nevada Medal. In 2009, Dr. Hansen received the American Meteorological Society's Carl-Gustaf Rossby

Research Medal. In 2010 he received the Sophie Prize and the Blue Planet Prize.

Additional Information:

Http://www.columbia.edu/~jeh1/
http://www.columbia.edu/~mhs119/
Photos: http://www.mediafire.com/folder/8ecel33ccmg8l/Hansen_Photos

Education:

BA with highest distinction (Physics and Mathematics), University of Iowa, 1963
MS (Astronomy), University of Iowa, 1965
Visiting student, Inst. of Astrophysics, University of Kyoto & Dept. of Astronomy, Tokyo University, Japan, 1965-1966
Ph.D. (Physics), University of Iowa, 1967

Research Interests:

Analysis of the causes and consequences of global climate change using the Earth's paleoclimate history, ongoing global observations, and interpretive tools including climate models. Connecting the dots all the way from climate observations to the policies that are needed to stabilize climate and preserve our planet for young people and other species.

Professional Employment:

1967-1969	NAS-NRC Resident Research Associate: Goddard Institute for Space Studies (GISS), NY
1969	NSF Postdoctoral Fellow: Leiden Observatory, Netherlands
1969-1972	Research Associate: Columbia University, NY
1972-1981	Staff Member/Space Scientist: Goddard Institute for Space Studies (GISS), Manager of GISS Planetary and Climate Programs
1978-1985	Adjunct Associate Professor: Department of Geological Sciences, Columbia University
1981-2013	Director: NASA Goddard Institute for Space Studies
1985-2013	Adjunct Professor: Earth and Environmental Sciences, Columbia University
2013-present	Director: Program on Climate Science, Awareness and Solutions, Columbia University

Project Experience:

1971-1974	Co-Principal Investigator AEROPOL Project (airborne terrestrial infrared polarimeter)
1972-1985	Co-Investigator, Voyager Photopolarimeter Experiment
1974-1994	Principal Investigator (1974-8) and subsequently Co-Investigator, Pioneer Venus Orbiter Cloud-Photopolarimeter Experiment
1977-2000	Principal Investigator, Galileo (Jupiter Orbiter) Photopolarimeter Radiometer Experiment

Teaching Experience:

Atmospheric Radiation (graduate level): New York Univ., Dept. of Meteorology & Oceanography
Intro. to Planetary Atmospheres & Climate Change: Columbia Univ., Dept. of Geological Sciences

Awards:

1977	Goddard Special Achievement Award (Pioneer Venus)
1978	NASA Group Achievement Award (Voyager, Photopolarimeter)
1984	NASA Exceptional Service Medal (Radiative Transfer)
1989	National Wildlife Federation Conservation Achievement Award
1990	NASA Presidential Rank Award of Meritorious Executive
1991	University of Iowa Alumni Achievement Award
1992	American Geophysical Union Fellow
1993	NASA Group Achievement Award (Galileo, Polarimeter/Radiometer)
1996	Elected to National Academy of Sciences
1996	GSFC William Nordberg Achievement Medal
1996	Editors' Citation for Excellence in Refereeing for Geophysical Research Letters
1997	NASA Presidential Rank Award of Meritorious Executive
2000	University of Iowa Alumni Fellow
2000	GISS Best Scientific Publication (peer vote): "Global warming – alternative scenario"
2001	John Heinz Environment Award
2001	Roger Revelle Medal, American Geophysical Union

2004	GISS Best Scientific Publication (peer vote): 'Soot Climate Forcing'
2005	GISS Best Scientific Publication (peer vote): 'Earth's Energy Imbalance'
2006	Duke of Edinburgh Conservation Medal, World Wildlife Fund (WWF)
2006	GISS Best Scientific Publication (peer vote): 'Global Temperature Change'
2006	*Time Magazine* designation as one of World's 100 Most Influential People.
2007	Laureate, Dan David Prize for Outstanding Achievements & Impacts in Quest for Energy
2007	Leo Szilard Award, American Physical Society for Outstanding Promotion & Use of Physics for the Benefit of Society
2007	Haagen-Smit Clean Air Award
2008	American Association for the Advancement of Science Award for Scientific Freedom and Responsibility
2008	Nevada Medal, Desert Research Institute
2008	Common Wealth Award for Distinguished Service in Science
2008	Bownocker Medal, Ohio State University
2008	Rachel Carson Award for Integrity in Science, Center for Science in the Public Interest
2009	Carl-Gustaf Rossby Research Medal, American Meteorological Society
2009	Peter Berle Environmental Integrity Award
2010	Sophie Prize for Environmental and Sustainable Development
2010	Blue Planet Prize, Asahi Glass Foundation – shared with Robert Watson
2011	American Association of Physics Teachers Klopsteg Memorial Award for communicating physics to the general public
2011	Edinburgh Medal from City of Edinburgh, Edinburgh Science Festival
2012	Steve Schneider Climate Science Communications Award
2012	*Foreign Policy* designation as one of its Top 100 Global Thinkers
2013	Ridenhour Courage Prize
2013	NASA Distinguished Service Medal
2014	Center for International Environmental Law's Frederick R. Anderson Award for Outstanding Contributions to Addressing Climate Change
2014	Walker Prize, Museum of Science, Boston
2017	2017 AAG Honorary Geographer, American Association of Geographers
2017	BBVA Foundation Frontiers of Knowledge Award in Climate Change, Spain – shared with Suki Manabe
2018	Tang Prize in Sustainable Development – shared with Veerabhadran Ramanathan

Publications:

von Schuckmann, K., L. Cheng, M.D. Palmer, J. Hansen et al., 2020: Heat stored in the Earth system: where does the energy go?, *Earth System Science Data*, **12**, 2013-2041, doi:10.5195/essd-12-2013-2020.

Beerling, D.J., E.P. Kantzas, M.R. Lomas, P. Wade, R.M. Eufrasio, P. Renforth, B. Sarkar, M.G. Andrews, R.H. James, C.R. Pearce, J. Mercure, H. Pollitt, P.B. Holden, N.R. Edwards, M. Khanna, L. Koh, S. Quegan, N.F. Pidgeon, I.A. Janssens, J. Hansen, S.A. Banwart, 2020: Potential for large-scale CO2 removal via enhanced rock weathering with croplands. *Nature*, **583**, 242-248, https://doi.org/10.1038/s41586-020-2448-9.

Rye, C.D., J. Marshall, M. Kelley, G. Russell, L. Nazarenko, Y. Kostov, G.A. Schmidt, J. Hansen, 2020: Antarctic Glacial Melt as a Driver of Recent Southern Ocean Climate Trends. *Geophysical Research Letters*, 47, e2019GL086892. https://doi.org/10.1029/2019GL086892

Miller, D.H., J.E. Hansen, 2019: Why Fee and Dividend Will Reduce Emissions Faster Than Other Carbon Pricing Policy Options, *Response to the Request for Information from the United States House of Representatives Select Committee on the Climate Crisis.*

Lenssen, N.J.L., G.A. Schmidt, J.E. Hansen, M.J. Menne, A. Persin, R. Ruedy, and D. Zyss, 2019: Improvements in the GISTEMP uncertainty model, *J. Geophys. Res. Atmos.*, **124**, no. 12, 6307-6326, 10.1029/2018JD029522.

Hansen, J., P. Kharecha, 2018: Cost of carbon capture: Can young people bear the burden? *Joule*, **2**, 1405-1407.

Beerling, D.J., J.R. Leake, S.P. Long, J.D. Scholes, J. Ton, P.N. Nelson, M. Bird, E. Kantzas, L.L. Taylor, B. Sarkar, M. Kelland, E. DeLucia, I. Kantola, C. Muller, G.H. Rau and J. Hansen, 2018: Farming with crops and rocks to address global climate, food and soil security, *Nature Plants*, **4**, 138-147.

Hansen, J., M. Sato, P. Kharecha, K. von Schuckmann, D.J. Beerling, J. Cao, S. Marcott, V. Masson-Delmotte, M.J. Prather, E.J. Rohling, J. Shakun, P. Smith, A. Lacis, G. Russell, and R. Ruedy, 2017: Young people's burden: requirement of negativeCO2 emissions. *Earth Syst. Dynam.*, **8**, 577-616, doi:10.5194/esd-8-577-2017.

Cao, J, A. Cohen, J. Hansen, R. Lester, P. Peterson and H. Xu , 2016: China-U.S. cooperation to advance nuclear power.

Science, **353**, 547-548. doi: 10.1126/science.aaf7131. Get a PDF from Scholarly Publications page

Hansen, J., M. Sato, P. Kharecha, K. von Schuckmann, D.J. Beerling, J. Cao, S. Marcott, V. Masson-Delmotte, M.J. Prather, E.J. Rohling, J. Shakun, P. Smith, 2016: Young people's burden: requirement of negative CO2 emissions. *Earth Syst. Dynam. Discuss.*, doi:10.5194/esd-2016-42, Published 4 October 2016.

Taylor, L.L., J. Quirk, R.M.S. Thorley, P.A. Kharecha, J. Hansen, A. Ridgwell, M.R. Lomas, S.A. Banwart, D.J. Beerling, 2016: Enhanced weathering strategies for stabilizing climate and averting ocean acidification. *Nature Climate Change*, **6**, 402-406. doi:10.1038/NCLIMATE2882.

Hansen, J., M. Sato, P. Hearty, R. Ruedy, et al., 2016: Ice melt, sea level rise and superstorms: evidence from paleoclimate data, climate modeling, and modern observations that 2°C global warming could be dangerous *Atmos. Chem. Phys.*, **16**, 3761-3812. doi:10.5194/acp-16-3761-2016.

Hansen, J. & M. Sato, 2016: Regional Climate Change and National Responsibilities *Environ. Res. Lett.* **11** 0340 09 (9 pp.), doi:10.1088/1748-9326/11/3/034009.

Von Schuckmann, K., Palmer, M.D., Trenberth, K.E., Cazenave, A., Chambers, D., Champollion, N. Hansen, J., Josey, S.A., Loeb, N., Mathieu, P.P., Meyssignac, B., and Wild, M., 2016: An imperative to monitor Earth's energy imbalance, Nature Clim. Change, 6, 138-144. doi:10.1038/nclimate2876.

Hansen, J., Sato, M., Hearty, P., Ruedy, R., Kelley, M., Masson-Delmotte, V., Russell, G., Tselioudis, G., Cao, J., Rignot, E., Velicogna, I., Kandiano, E., von Schuckmann, K., Kharecha, P., Legrande, A. N., Bauer, M., and Lo, K.-W.: Ice melt, sea level rise and superstorms: evidence from paleoclimate data, climate modeling, and modern observations that 2 °C global warming is highly dangerous, Atmos. Chem. Phys. Discuss., 15, 20059-20179, doi:10.5194/acpd-15-20059-2015, 2015.

Hansen, J., 2015: Environment and Development Challenges: The Imperative of a Carbon Fee and Dividend. The Oxford Handbook of the Macroeconomics of Global Warming, Eds. Lucas Bernard and Willi Semmler, Chapter 26, doi:10.1093/oxfordhb/9780199856978.013.0026.

Nazarenko, L., G.A. Schmidt, R.L. Miller, N. Tausnev, M. Kelley, R. Ruedy, G.L. Russell, I. Aleinov, M. Bauer, S. Bauer, R. Bleck, V. Canuto, Y. Cheng, T.L. Clune, A.D. Del Genio, G. Faluvegi, J.E. Hansen, R.J. Healy, N.Y. Kiang, D. Koch, A.A. Lacis, A.N. LeGrande, J. Lerner, K.K. Lo, S. Menon, V. Oinas, J.P. Perlwitz, M.J. Puma, D. Rind, A. Romanou, M. Sato, D.T. Shindell, S. Sun, K. Tsigaridis, N. Unger, A. Voulgarakis, M.-S. Yao, and J. Zhang, 2015: Future climate change under RCP emission scenarios with GISS ModelE2. *J. Adv. Model. Earth Syst.*, 6, 441-477, no. 1, doi:10.1002/2013MS000266.

Hansen, J. 2014: The Energy to Fight Injustice. *Chemistry World*.

Miller, R.L., G.A. Schmidt, L.S. Nazarenko, N. Tausnev, S.E. Bauer, A.D. Del Genio, M. Kelley, K.K. Lo, R. Ruedy, D.T. Shindell, I. Aleinov, M. Bauer, R. Bleck, V. Canuto, Y.-H. Chen, Y. Cheng, T.L. Clune, G. Faluvegi, J.E. Hansen, R.J. Healy, N.Y. Kiang, D. Koch, A.A. Lacis, A.N. LeGrande, J. Lerner, S. Menon, V. Oinas, C. Pérez García-Pando, J.P. Perlwitz, M.J. Puma, D. Rind, A. Romanou, G.L. Russell, M. Sato, S. Sun, K. Tsigaridis, N. Unger, A. Voulgarakis, M. S. Yao, and J. Zhang, 2014: CMIP5 historical simulations (1850-2012) with GISS ModelE2. *J. Adv. Model. Earth Syst.*, **6**, no. 2, 441-477, doi:10.1002/2013MS000266.

Schmidt, G.A., M. Kelley, L. Nazarenko, R. Ruedy, G.L. Russell, I. Aleinov, M. Bauer, S.E. Bauer, M.K. Bhat, R. Bleck, V. Canuto, Y.-H. Chen, Y. Cheng, T.L. Clune, A. Del Genio, R. de Fainchtein, G. Faluvegi, J.E. Hansen, R.J. Healy, N.Y. Kiang, D. Koch, A.A. Lacis, A.N. LeGrande, J. Lerner, K.K. Lo, E.E. Matthews, S. Menon, R.L. Miller, V. Oinas, A.O. Oloso, J.P. Perlwitz, M.J. Puma, W.M. Putman, D. Rind, A. Romanou, M. Sato, D.T. Shindell, S. Sun, R.A. Syed, N. Tausnev, K. Tsigaridis, N. Unger, A. Voulgarakis, M.-S. Yao, and J. Zhang, 2014: Configuration and assessment of the GISS ModelE2 contributions to the CMIP5 archive. J. Adv. Model. Earth Syst., **6**, 141-184, doi:10.1002/2013MS000265.

Hansen, J., M. Sato, and R. Ruedy, 2013: Reply to Rhines and Huybers: Changes in the frequency of extreme summer heat. *Proc. Natl. Acad. Sci.*, **110**, E547-E548, doi:10.1073/pnas.1220916110.

Hansen, J., P. Kharecha, M. Sato, V. Masson-Delmotte, F. Ackerman, D. Beerling, P.J. Hearty, O. Hoegh-Guldberg, S.-L.Hsu, C. Parmesan, J. Rockstrom, E.J. Rohling, J. Sachs, P. Smith, K. Steffen, L. Van Susteren, K. von Schuckmann, and J.C. Zachos, 2013: Assessing "dangerous climate change": Required reduction of carbon emissions to protect young people, future generations and nature. *PLOS ONE*, **8**, e81648.

Hansen, J., M. Sato, and R. Ruedy, 2013: Reply to Stone et al.: Human-made role in local temperature extremes. *Proc. Natl. Acad. Sci.*, **110**, E1544, doi:10.1073/pnas.1301494110.

Kharecha, P., and J.E. Hansen, 2013: Response to comment by Rabilloud on "Prevented mortality and greenhouse gas emissions from historical and projected nuclear power". *Environ. Sci. Technol.*, **47**, 13900-13901, doi:10.1021/es404806w.

Kharecha, P.A., and J.E. Hansen, 2013: Response to comment on "Prevented mortality and greenhouse gas emissions from historical and projected nuclear power". *Environ. Sci. Technol.*, **47**, 6718-6719, doi:10.1021/es402211m.

Hansen, J., M. Sato, G. Russell, and P. Kharecha, 2013: Climate sensitivity, sea level, and atmospheric carbon dioxide, *Phil. Trans. Roy. Soc. A*, 371, 20120294, http://dx.doi.org/10.1098/rsta.2012.0294.

Kharecha, P.A., and J.E. Hansen, 2013: Prevented mortality and greenhouse gas emissions from historical and projected nuclear power. *Environ. Sci. Technol.*, **47**, 4889-4895, doi:10.1021/es3051197

Hansen, J., P. P. Kharecha, and M. Sato, 2013: Climate forcing growth rates: Doubling down on our Faustian bargain. *Environ. Res. Lett.*, 8, 011006, doi:10.1088/1748-9326/8/1/011006.

Lacis, A.A., J.E. Hansen, G.L. Russell, V. Oinas, and J. Jonas, 2013: The role of long-lived greenhouse gases as principal LW control knob that governs the global surface temperature for past and future climate change. *Tellus B*, **65**, 19734, doi:10.3402/tellusb.v65i0.19734

Previdi, M., B.G. Liepert, D. Peteet, J. Hansen, D.J. Beerling, A.J. Broccoli, S. Frolking, J.N. Galloway, M. Heimann, C. Le Quéré, S. Levitus, and V. Ramaswamy, 2013: Climate sensitivity in the Anthropocene. *Q. J. R. Meteorol. Soc.*, **139**, 1121-1131, doi:10.1002/qj.2165.

Rohling, E.J., A. Sluijs, H.A. Dijkstra, P. Köhler, R.S.W. van de Wal, A.S. von der Heydt, D.J. Beerling, A. Berger, P.K. Bijl, M. Crucifix, R. DeConto, S.S. Drijfhout, A. Fedorov, G.L. Foster, A. Ganopolski, J. Hansen, B. Hönisch, H. Hooghiemstra, M. Huber, P. Huybers, R. Knutti, D.W. Lea, L.J. Lourens, D. Lunt, V. Masson-Demotte, M. Medina-Elizalde, B. Otto-Bliesner, M. Pagani, H. Pälike, H. Renssen, D.L. Royer, M. Siddall, P. Valdes, J.C. Zachos, and R.E. Zeebe, 2012: Making sense of palaeoclimate sensitivity. *Nature*, **491**, 683-691, doi:10.1038/nature11574.

Hansen, J., M. Sato, and R. Ruedy, 2012: Perception of climate change. *Proc. Natl. Acad. Sci.*, **109**, 14726-14727, E2415-E2423, doi:10.1073/pnas.1205276109.

Hansen, J.E., and M. Sato, 2012: Paleoclimate implications for human-made climate change. In *Climate Change:Inferences from Paleoclimate and Regional Aspects*. A. Berger, F. Mesinger, and D. Šijački, Eds. Springer, pp. 21- 48, doi:10.1007/978-3-7091-0973-1_2.

Hansen, J., M. Sato, P. Kharecha, and K. von Schuckmann, 2011: Earth's energy imbalance and implications. *Atmos. Chem. Phys.*, **11**, 13421-13449, doi:10.5194/acp-11-13421-2011.

Kharecha, P.A., C.F. Kutscher, J.E. Hansen, and E. Mazria, 2010: Options for near-term phaseout of CO2 emissions from coal use in the United States. *Environ. Sci. Technol.*, 44, 4050-4062, doi:10.1021/es903884a.

Hansen, J., R. Ruedy, M. Sato, and K. Lo, 2010: Global surface temperature change. *Rev. Geophys.*, 48, RG4004, doi:10.1029/2010RG000345.

Masson-Delmotte, V., B. Stenni, K. Pol, P. Braconnot, O. Cattani, S. Falourd, M. Kageyama, J. Jouzel, A. Landais, B. Minster, J.M. Barnola, J. Chappellaz, G. Krinner, S. Johnsen, R. Röthlisberger, J. Hansen, U. Mikolajewicz, and B. Otto-Bliesner, 2010: EPICA Dome C record of glacial and interglacial intensities. *Quat. Sci. Rev.*, **29**, 113-128, doi:10.1016/j.quascirev.2009.09.030.

Rockström, J., W. Steffen, K. Noone, Å. Persson, F.S. Chapin, III, E. Lambin, T.M. Lenton, M. Scheffer, C. Folke, H. Schellnhuber, B. Nykvist, C.A. De Wit, T. Hughes, S. van der Leeuw, H. Rodhe, S. Sörlin, P.K. Snyder, R. Costanza, U. Svedin, M. Falkenmark, L. Karlberg, R.W. Corell, V.J. Fabry, J. Hansen, B. Walker, D. Liverman, K. Richardson, P. Crutzen, and J. Foley, 2009: Planetary boundaries: Exploring the safe operating space for humanity. *Ecol. Soc.*, **14** (2), 32.

Rockström, J., W. Steffen, K. Noone, Å. Persson, F.S. Chapin, III, E.F. Lambin, T.M. Lenton, M. Scheffer, C. Folke, H.J. Schellnhuber, B. Nykvist, C.A. de Wit, T. Hughes, S. van der Leeuw, H. Rodhe, S. Sörlin, P.K. Snyder, R. Costanza, U. Svedin, M. Falkenmark, L. Karlberg, R.W. Corell, V.J. Fabry, J. Hansen, B. Walker, D. Liverman, K. Richardson, P. Crutzen, and J.A. Foley, 2009: A safe operating space for humanity. *Nature*, **461**, 472-475, doi:10.1038/461472a.

Xu, B., J. Cao, J. Hansen, T. Yao, D.J. Joswia, N. Wang, G. Wu, M. Wang, H. Zhao, W. Yang, X. Liu, and J. He, 2009: Black soot and the survival of Tibetan glaciers. *Proc. Natl. Acad. Sci.*, **106** , 22114-22118, doi:10.1073/pnas.0910444106.

Hansen, J., Mki. Sato, P. Kharecha, D. Beerling, R. Berner, V. Masson-Delmotte, M. Pagani, M. Raymo, D.L. Royer, and J.C. Zachos, 2008: Target atmospheric CO_2: Where should humanity aim? *Open Atmos. Sci. J.*, **2**, 217-231, doi:10.2174/1874282300802010217.

Kharecha, P.A., and J.E. Hansen, 2008: Implications of "peak oil" for atmospheric CO_2 and climate. *Global Biogeochem. Cycles*, **22**, GB3012, doi:10.1029/2007GB003142.

Hansen, J., 2008: Tipping Point: Perspective of a Climatologist. In *The State of the Wild: A Global Portrait of Wildlife, Wild Lands, and Oceans*. E. Fearn, Ed. Wildlife Conservation Society/Island Press, pp. 6-15.

Hansen, J.E., 2007: Scientific reticence and sea level rise. *Environ. Res. Lett.*, **2**, 024002, doi:10.1088/1748-9326/2/2/024002.

Hansen, J., Mki. Sato, R. Ruedy, and 44 co-authors, 2007: Climate simulations for 1880-2003 with GISS modelE. *Clim. Dynam.*, **29**, 661-696, doi:10.1007/s00382-007-0255-8.

Hansen, J., 2007: Climate catastrophe. *New Scientist*, **195**, no. 2614 (July 28), 30-34.

Hansen, J., 2007: Why we can't wait: A 5-step plan for solving the global crisis. *Nation*, **284**, no. 18 (May 7), 13-14.

Hansen, J., Mki. Sato, P. Kharecha, G. Russell, D.W. Lea, and M. Siddall, 2007: Climate change and trace gases. *Phil. Trans.*

Royal. Soc. A, **365**, 1925-1954, doi:10.1098/rsta.2007.2052.
Hansen, J., Mki. Sato, R. Ruedy, and 44 co-authors, 2007: Dangerous human-made interference with climate: A GISS modelE study. *Atmos. Chem. Phys.*, **7**, 2287-2312.
Hansen, J.E., 2007: Scientific reticence and sea level rise. *Environ. Res. Lett.*, **2**, 024002, doi:10.1088/17489326/2/2/024002.
Nazarenko, L., N. Tausnev, and J. Hansen, 2007: The North Atlantic thermohaline circulation simulated by the GISS climate model during 1970-99. *Atmos.-Ocean*, **45**, 81-92, doi:10.3137/ao.450202.
Mishchenko, M.I., B. Cairns, G. Kopp, C.F. Schueler, B.A. Fafaul, J.E. Hansen, R.J. Hooker, T. Itchkawich, H.B. Maring, and L.D. Travis, 2007: Precise and accurate monitoring of terrestrial aerosols and total solar irradiance: Introducing the Glory mission. *Bull. Amer. Meteorol. Soc.*, **88**, 677-691, doi:10.1175/BAMS-88-5-677.
Novakov, T., S. Menon, T.W. Kirchstetter, D. Koch, and J.E. Hansen, 2007: Reply to comment by R. L. Tanner and D. J.Eatough on "Aerosol organic carbon to black carbon ratios: Analysis of published data and implications for climate forcing". *J. Geophys. Res.*, **112**, D02203, doi:10.1029/2006JD007941.
Rahmstorf, S., A. Cazenave, J.A. Church, J.E. Hansen, R.F. Keeling, D.E. Parker, and R.C.J. Somerville, 2007: Recent climate observations compared to projections. *Science*, **316**, 709, doi:10.1126/science.1136843.
Hansen, J., 2006: The threat to the planet. *New York Rev. Books*, **53**, no. 12 (July 13, 2006), 12-16.
Hansen, J., Mki. Sato, R. Ruedy, K. Lo, D.W. Lea, and M. Medina-Elizade, 2006: Global temperature change. *Proc. Natl. Acad. Sci.*, **103**, 14288-14293, doi:10.1073/pnas.0606291103.
Nazarenko, L., N. Tausnev, and J. Hansen, 2006: Sea-ice and North Atlantic climate response to CO_2-induced warming and cooling conditions. *J. Glaciol.*, **52**, 433-439.
Santer, B.D., T.M.L. Wigley, P.J. Gleckler, C. Bonfils, M.F. Wehner, K. AchutaRao, T.P. Barnett, J.S. Boyle, W. Brüggemann, M. Fiorino, N. Gillett, J.E. Hansen, P.D. Jones, S.A. Klein, G.A. Meehl, S.C.B. Raper, R.W. Reynolds, K.E. Taylor, and W.M. Washington, 2006: Forced and unforced ocean temperature changes in Atlantic and Pacific tropical cyclogenesis regions. *Proc. Natl. Acad. Sci.*, **103**, 13905-13910, doi:10.1073/pnas.0602861103.
Schmidt, G.A., R. Ruedy, J.E. Hansen, I. Aleinov, N. Bell, M. Bauer, S. Bauer, B. Cairns, V. Canuto, Y. Cheng, A. Del Genio, G. Faluvegi, A.D. Friend, T.M. Hall, Y. Hu, M. Kelley, N.Y. Kiang, D. Koch, A.A. Lacis, J. Lerner, K.K. Lo, R.L. Miller, L. Nazarenko, V. Oinas, Ja. Perlwitz, Ju. Perlwitz, D. Rind, A. Romanou, G.L. Russell, Mki. Sato, D.T. Shindell, P.H. Stone, S. Sun, N. Tausnev, D. Thresher, and M.-S. Yao, 2006: Present day atmospheric simulations using GISS ModelE: Comparison to in-situ, satellite and reanalysis data. *J. Climate*, **19**, 153-192, doi:10.1175/JCLI3612.1.
Shindell, D., G. Faluvegi, A. Lacis, J. Hansen, R. Ruedy, and E. Aguilar, 2006: Role of tropospheric ozone increases in 20th century climate change. *J. Geophys. Res.*, **111**, D08302, doi:10.1029/2005JD006348.
Shindell, D.T., G. Faluvegi, R.L. Miller, G.A. Schmidt, J.E. Hansen, and S. Sun, 2006: Solar and anthropogenic forcing of tropical hydrology. *Geophys. Res. Lett.*, **33**, L24706, doi:10.1029/2006GL027468, 2006.
Hansen, J., L. Nazarenko, R. Ruedy, Mki. Sato, and 11 co-authors, 2005: Earth's energy imbalance: Confirmation and implications. *Science*, **308**, 1431-1435, doi:10.1126/science.1110252.
Hansen, J., Mki. Sato, R. Ruedy, L. Nazarenko, A. Lacis, G.A. Schmidt, G. Russell, and 38 co-authors, 2005: Efficacy of climate forcings. *J. Geophys. Res.*, **110**, D18104, doi:10.1029/2005JD005776.
Hansen, J.E., 2005: A slippery slope: How much global warming constitutes "dangerous anthropogenic interference"? An editorial essay. *Climatic Change*, **68**, 269-279, doi:10.1007/s10584-005-4135-0.
Koch, D., and J. Hansen, 2005: Distant origins of Arctic black carbon: A Goddard Institute for Space Studies ModelE experiment. *J. Geophys. Res.*, **110**, D04204, doi:10.1029/2004JD005296.
Novakov, T., S. Menon, T.W. Kirchstetter, D. Koch, and J.E. Hansen, 2005: Aerosol organic carbon to black carbon ratios: Analysis of published data and implications for climate forcing. *J. Geophys. Res.*, **110**, D21205, doi:10.1029/2005JD005977.
Santer, B.D., T.M.L. Wigley, C. Mears, F.J. Wentz, S.A. Klein, D.J. Seidel, K.E. Taylor, P.W. Thorne, M.F. Wehner, P.J. Gleckler, J.S. Boyle, W.D. Collins, K.W. Dixon, C. Doutriaux, M. Free, Q. Fu, J.E. Hansen, and 8 co-authors, 2005: Amplification of surface temperature trends and variability in the tropical atmosphere. *Science*, **309**, 1551-1556, doi:10.1126/science.1114867.
Hansen, J., 2004: Defusing the global warming time bomb. *Sci. Amer.*, **290**, no. 3, 68-77.
Hansen, J., T. Bond, B. Cairns, H. Gaeggler, B. Liepert, T. Novakov, and B. Schichtel, 2004: Carbonaceous aerosols in the industrial era. *Eos Trans. Amer. Geophys. Union*, **85**, no. 25, 241, 245.
Hansen, J., and L. Nazarenko, 2004: Soot climate forcing via snow and ice albedos. *Proc. Natl. Acad. Sci.*, **101**, 423-428, doi:10.1073/pnas.2237157100.
Hansen, J., and Mki. Sato, 2004: Greenhouse gas growth rates. *Proc. Natl. Acad. Sci.*, **101**, 16109-16114, doi:10.1073/pnas.0406982101.
Mishchenko, M.I., B. Cairns, J.E. Hansen, L.D. Travis, R. Burg, Y.J. Kaufman, J.V. Martins, and E.P. Shettle, 2004: Monitoring of aerosol forcing of climate from space: Analysis of measurement requirements. *J. Quant. Spectrosc. Radiat.*

Transfer, **88**, 149-161, doi:10.1016/j.jqsrt.2004.03.030.
Novakov, T., and J.E. Hansen, 2004: Black carbon emissions in the United Kingdom during the past four decades: An empirical analysis. *Atmos. Environ.*, **38**, 4155-4163, doi:10.1016/j.atmosenv.2004.04.031.
Hansen, J., 2003: Can we defuse the global warming time bomb? *naturalScience*, posted Aug. 1, 2003.
Novakov, T., V. Ramanathan, J.E. Hansen, T.W. Kirchstetter, Mki. Sato, J.E. Sinton, and J.A. Satahye, 2003: Large historical changes of fossil-fuel black carbon aerosols. *Geophys. Res. Lett.*, **30**, no. 6, 1324, doi:10.1029/2002GL016345
Santer, B.D., R. Sausen, T.M.L. Wigley, J.S. Boyle, K. AchutaRao, C. Doutriaux, J.E. Hansen, G.A. Meehl, E. Roeckner, R. Ruedy, G. Schmidt, and K.E. Taylor, 2003: Behavior of tropopause height and atmospheric temperature in models, reanalyses, and observations: Decadal changes. *J. Geophys. Res.*, **108**, no. D1, 4002, doi:10.1029/2002JD002258.
Sato, Mki., J. Hansen, D. Koch, A. Lacis, R. Ruedy, O. Dubovik, B. Holben, M. Chin, and T. Novakov, 2003: Global atmospheric black carbon inferred from AERONET. *Proc. Natl. Acad. Sci.*, **100**, 6319-6324, doi:10.1073/pnas.0731897100.
Sun, S., and J.E. Hansen, 2003: Climate simulations for 1951-2050 with a coupled atmosphere-ocean model. *J. Climate*, **16**, 2807-2826, doi:10.1175/1520-0442(2003)016<2807:CSFWAC>2.0.CO;2.
Carmichael, G.R., D.G. Streets, G. Calori, M. Amann, M.Z. Jacobson, J. Hansen, and H. Ueda, 2002: Changing trends in sulfur emissions in Asia: Implications for acid deposition. *Environ. Sci. Tech*, **36**, 4707-4713, doi:10.1021/es011509c.
Hansen, J., R. Ruedy, Mki. Sato, and K. Lo, 2002: Global warming continues. *Science*, **295**, 275, doi:10.1126/science.295.5553.275c.
Hansen, J., Mki. Sato, L. Nazarenko, R. Ruedy, A. Lacis, D. Koch, I. Tegen, T. Hall,and 20 co-authors, 2002: Climate forcings in Goddard Institute for Space Studies SI2000 simulations. *J. Geophys. Res.*, **107**, no. D18, 4347, doi:10.1029/2001JD001143.
Hansen, J.E. (Ed.), 2002: *Air Pollution as a Climate Forcing: A Workshop*. NASA Goddard Institute for Space Studies.
Hansen, J.E., 2002: A brighter future. *Climatic Change*, **52**, 435-440, doi:10.1023/A:1014226429221
Menon, S., J.E. Hansen, L. Nazarenko, and Y. Luo, 2002: Climate effects of black carbon aerosols in China and India. *Science*,**297**, 2250-2253, doi:10.1126/science.1075159.
Robinson, W.A., R. Ruedy, and J.E. Hansen, 2002: General circulation model simulations of recent cooling in the east–central United States. *J. Geophys. Res.*, **107**, no. D24, 4748, doi:10.1029/2001JD001577.
Hansen, J.E., R. Ruedy, Mki. Sato, M. Imhoff, W. Lawrence, D. Easterling, T. Peterson, and T. Karl, 2001: A closer look at United States and global surface temperature change. *J. Geophys. Res.*, **106**, 23947-23963, doi:10.1029/2001JD000354.
Hansen, J.E., and Mki. Sato, 2001: Trends of measured climate forcing agents. *Proc. Natl. Acad. Sci.*, **98**, 14778-14783, doi:10.1073/pnas.261553698.
Nazarenko, L., J. Hansen, N. Tausnev, and R. Ruedy, 2001: Response of the Northern Hemisphere sea ice to greenhouse forcing in a global climate model. *Ann. Glaciol.*, **33**, 513-520.
Oinas, V., A.A. Lacis, D. Rind, D.T. Shindell, and J.E. Hansen, 2001: Radiative cooling by stratospheric water vapor: Big differences in GCM results. *Geophys. Res. Lett.*, **28**, 2791-2794, doi:10.1029/2001GL013137.
Santer, B.D., T.M.L. Wigley, C. Doutriaux, J.S. Boyle, J.E. Hansen, P.D. Jones, G.A. Meehl, E. Roeckner, S. Sengupta, and K.E. Taylor, 2001: Accounting for the effects of volcanoes and ENSO in comparisons of modeled and observed temperature trends. *J. Geophys. Res.*, **106**, 28033-28059, doi:10.1029/2000JD000189.
Streets, D.G., K. Jiang, X. Hu, J.E. Sinton, X.-Q. Zhang, D. Xu, M.Z. Jacobson, and J.E. Hansen, 2001: Recent reductions in China's greenhouse gas emissions. *Science*, **294**, 1835-1837, doi:10.1126/science.1065226.
Hansen, J., R. Ruedy, A. Lacis, Mki. Sato, L. Nazarenko, N. Tausnev, I. Tegen, and D. Koch, 2000: Climate modeling in the global warming debate. In *General Circulation Model Development*. D. Randall, Ed. Academic Press, pp. 127-164.
Hansen, J., Mki. Sato, R. Ruedy, A. Lacis, and V. Oinas, 2000: Global warming in the twenty-first century: An alternative scenario. *Proc. Natl. Acad. Sci.*, **97**, 9875-9880, doi:10.1073/pnas.170278997.
Hansen, J.E., 2000: The Sun's role in long-term climate change. *Space Sci. Rev.*, **94**, 349-356, doi:10.1023/A:1026748129347.
Lacis, A.A., B.E. Carlson, and J.E. Hansen, 2000: Retrieval of atmospheric NO_2, O_3, aerosol optical depth, effective radius and variance information from SAGE II multi-spectral extinction measurements. *Appl. Math. Comput.*, **116**, 133-151, doi:10.1016/S0096-3003(99)00200-3.
Hansen, J., R. Ruedy, J. Glascoe, and Mki. Sato, 1999: GISS analysis of surface temperature change. *J. Geophys. Res.*, **104**, 30997-31022, doi:10.1029/1999JD900835.
Hansen, J., Mki. Sato, J. Glascoe, and R. Ruedy, 1998: A common sense climate index: Is climate changing noticeably? *Proc. Natl. Acad. Sci.*, **95**, 4113-4120.
Hansen, J., Mki. Sato, A. Lacis, R. Ruedy, I. Tegen, and E. Matthews, 1998: Perspective: Climate forcings in the industrial era. *Proc. Natl. Acad. Sci.*, **95**, 12753-12758.
Hansen, J.E., 1998: Book review of Sir John Houghton's *Global Warming: The Complete Briefing*. *J. Atmos. Chem.*, **30**, 409-412.

Hansen, J.E., Mki. Sato, R. Ruedy, A. Lacis, and J. Glascoe, 1998: Global climate data and models: A reconciliation. *Science*, **281**, 930-932, doi:10.1126/science.281.5379.930.

Matthews, E., and J. Hansen (Eds.), 1998: *Land Surface Modeling: A Mini-Workshop*. NASA Goddard Institute for Space Studies.

Hansen, J., C. Harris, C. Borenstein, B. Curran, and M. Fox, 1997: Research education. *J. Geophys. Res.*, **102**, 25677-25678, doi:10.1029/97JD02172.

Hansen, J., R. Ruedy, A. Lacis, G. Russell, Mki. Sato, J. Lerner, D. Rind, and P. Stone, 1997: Wonderland climate model. *J. Geophys. Res.*, **102**, 6823-6830, doi:10.1029/96JD03435.

Hansen, J., Mki. Sato, A. Lacis, and R. Ruedy, 1997: The missing climate forcing. *Phil. Trans. Royal Soc. London B*, **352**, 231-240.

Hansen, J., Mki. Sato, and R. Ruedy, 1997: Radiative forcing and climate response. *J. Geophys. Res.*, **102**, 6831-6864, doi:10.1029/96JD03436.

Hansen, J., Mki. Sato, R. Ruedy, A. Lacis, K. Asamoah, K. Beckford, S. Borenstein, E. Brown, B. Cairns, B. Carlson, B. Curran, S. de Castro, L. Druyan, P. Etwarrow, T. Ferede, M. Fox, D. Gaffen, J. Glascoe, H. Gordon, S. Hollandsworth, X. Jiang, C. Johnson, N. Lawrence, J. Lean, J. Lerner, K. Lo, J. Logan, A. Luckett, M.P. McCormick, R. McPeters, R.L. Miller, P. Minnis, I. Ramberran, G. Russell, P. Russell, P. Stone, I. Tegen, S. Thomas, L. Thomason, A. Thompson, J. Wilder, R. Willson, and J. Zawodny, 1997: Forcings and chaos in interannual to decadal climate change. *J. Geophys. Res.*, **102**, 25679-25720, doi:10.1029/97JD01495.

Hansen, J., 1996: Climatic change: understanding global warming, pp. 173-190, in *One World: The Health and Survival of the Human Species in the 21st Century*, Ed. R. Lanza, Health Press, Santa Fe, NM, 325 pp.

Hansen, J., R. Ruedy, Mki. Sato, and R. Reynolds, 1996: Global surface air temperature in 1995: Return to pre-Pinatubo level. *Geophys. Res. Lett.*, **23**, 1665-1668, doi:10.1029/96GL01040.

Hansen, J., Mki. Sato, R. Ruedy, A. Lacis, K. Asamoah, S. Borenstein, E. Brown, B. Cairns, G. Caliri, M. Campbell, B. Curran, S. de Castro, L. Druyan, M. Fox, C. Johnson, J. Lerner, M.P. McCormick, R.L. Miller, P. Minnis, A. Morrison, L. Pandolfo, I. Ramberran, F. Zaucker, M. Robinson, P. Russell, K. Shah, P. Stone, I. Tegen, L. Thomason, J. Wilder, and H. Wilson, 1996: A Pinatubo climate modeling investigation. In *The Mount Pinatubo Eruption: Effects on the Atmosphere and Climate*, NATO ASI Series Vol. I 42. G. Fiocco, D. Fua, and G. Visconti, Eds. Springer-Verlag, pp. 233-272.

Hansen, J., W. Rossow, B. Carlson, A. Lacis, L. Travis, A. Del Genio, I. Fung, B. Cairns, M. Mishchenko, and Mki. Sato, 1995: Low-cost long-term monitoring of global climate forcings and feedbacks. *Climatic Change*, **31**, 247-271, doi:10.1007/BF01095149.

Hansen, J., Mki. Sato, and R. Ruedy, 1995: Long-term changes of the diurnal temperature cycle: Implications about mechanisms of global climate change. *Atmos. Res.*, **37**, 175-209, doi:10.1016/0169-8095(94)00077-Q.

Hansen, J., H. Wilson, Mki. Sato, R. Ruedy, K. Shah, and E. Hansen, 1995: Satellite and surface temperature data at odds? *Climatic Change*, **30**, 103-117, doi:10.1007/BF01093228.

Hansen, J., 1993: Climate forcings and feedbacks. In *Long-Term Monitoring of Global Climate Forcings and Feedbacks*, NASA CP-3234. J. Hansen, W. Rossow, and I. Fung, Eds. National Aeronautics and Space Administration, pp. 6-12.

Hansen, J., 1993: Climsat rationale. In *Long-Term Monitoring of Global Climate Forcings and Feedbacks*, NASA CP-3234. J. Hansen, W. Rossow, and I. Fung, Eds. National Aeronautics and Space Administration, pp. 26-35.

Hansen, J., A. Lacis, R. Ruedy, Mki. Sato, and H. Wilson, 1993: How sensitive is the world's climate? *Natl. Geog. Soc. Res. Exploration*, **9**, 142-158.

Hansen, J., W. Rossow, and I. Fung (Eds.), 1993: *Long-Term Monitoring of Global Climate Forcings and Feedbacks.* NASA CP-3234. National Aeronautics and Space Administration.

Hansen, J., and H. Wilson, 1993: Commentary on the significance of global temperature records. *Climatic Change*, **25**, 185-191, doi:10.1007/BF01661206.

Pollack, J.B., D. Rind, A. Lacis, J.E. Hansen, Mki. Sato, and R. Ruedy, 1993: GCM simulations of volcanic aerosol forcing. Part I: Climate changes induced by steady-state perturbations. *J. Climate*, **6**, 1719-1742, doi:10.1175/1520-0442(1993)006<1719:GSOVAF>2.0.CO;2.

Sato, Mki., J.E. Hansen, M.P. McCormick, and J.B. Pollack, 1993: Stratospheric aerosol optical depths, 1850-1990. *J. Geophys. Res.*, **98**, 22987-22994, doi:10.1029/93JD02553.

Charlson, R.J., S.E. Schwartz, J.M. Hales, R.D. Cess, J.A. Coakley, Jr., J.E. Hansen, and D.J. Hoffman, 1992: Climate forcing by anthropogenic aerosols. *Science*, **255**, 423-430, doi:10.1126/science.255.5043.423.

Hansen, J., A. Lacis, R. Ruedy, and Mki. Sato, 1992: Potential climate impact of Mount Pinatubo eruption. *Geophys. Res. Lett.*, **19**, 215-218, doi:10.1029/91GL02788.

Lacis, A., J. Hansen, and Mki. Sato, 1992: Climate forcing by stratospheric aerosols. *Geophys. Res. Lett.*, **19**, 1607-1610, doi:10.1029/92GL01620.

Hansen, J.E., and A. Lacis, 1991: Sun and water in the greenhouse: Reply to comments. *Nature*, **349**, 467, doi:10.1038/349467c0.
Hansen, J., D. Rind, A. Del Genio, A. Lacis, S. Lebedeff, M. Prather, R. Ruedy, and T. Karl, 1991: Regional greenhouse climate effects. In *Greenhouse-Gas-Induced Climatic Change: A Critical Appraisal of Simulations and Observations*. M.E. Schlesinger, Ed. Elsevier, pp. 211-229.
Hansen, J., W. Rossow, and I. Fung, 1990: The missing data on global climate change. *Issues Sci. Technol.*, **7**, 62-69.
Hansen, J.E., and A.A. Lacis, 1990: Sun and dust versus greenhouse gases: An assessment of their relative roles in global climate change. *Nature*, **346**, 713-719, doi:10.1038/346713a0.
Hansen, J.E., A.A. Lacis, and R.A. Ruedy, 1990: Comparison of solar and other influences on long-term climate. In *Climate Impact of Solar Variability*, NASA CP-3086. K.H. Schatten and A. Arking, Eds. National Aeronautics and Space Administration, pp. 135-145.
Lorius, C., J. Jouzel, D. Raynaud, J. Hansen, and H. Le Treut, 1990: The ice-core record: Climate sensitivity and future greenhouse warming. *Nature*, **347**, 139-145, doi:10.1038/347139a0.
Rind, D., R. Goldberg, J. Hansen, C. Rosenzweig, and R. Ruedy, 1990: Potential evapotranspiration and the likelihood of future drought. *J. Geophys. Res.*, **95**, 9983-10004.
Hansen, J., A. Lacis, and M. Prather, 1989: Greenhouse effect of chlorofluorocarbons and other trace gases. *J. Geophys. Res.*, **94**, 16417-16421.
Hansen, J., D. Rind, A. Del Genio, A. Lacis, S. Lebedeff, M. Prather, R. Ruedy, and T. Karl, 1989: Regional greenhouse climate effects. In *Coping with Climatic Change: Proceedings of the Second North American Conference on Preparing for Climate Change*. J.C. Topping, Jr., Ed. The Climate Institute.
Hansen, J., I. Fung, A. Lacis, D. Rind, Lebedeff, R. Ruedy, G. Russell, and P. Stone, 1988: Global climate changes as forecast by Goddard Institute for Space Studies three-dimensional model. *J. Geophys. Res.*, **93**, 9341-9364, doi:10.1029/88JD00231.
Hansen, J., and S. Lebedeff, 1988: Global surface air temperatures: Update through 1987. *Geophys. Res. Lett.*, **15**, 323-326, doi:10.1029/88GL02067.
Hansen, J.E., and S. Lebedeff, 1987: Global trends of measured surface air temperature. *J. Geophys. Res.*, **92**, 13345-13372.
Ramanathan, V., L. Callis, R. Cess, J. Hansen, I. Isaksen, W. Kuhn, A. Lacis, F. Luther, J. Mahlman, R. Reck, and M. Schlesinger, 1987: Climate-chemical interactions and effects of changing atmospheric trace gases. *Rev. Geophys.*, **25**, 1441-1482.
Hunten, D.M., L. Colin, and J.E. Hansen, 1986: Atmospheric science on the Galileo mission. *Space Sci. Rev.*, **44**, 191-240, doi:10.1007/BF00200817.
Hansen, J.E., 1985: Geophysics: Global sea level trends. *Nature*, **313**, 349-350.
Bennett, T., W. Broecker, and J. Hansen (Eds.), 1985: *North Atlantic Deep Water Formation*. NASA CP-2367. National Aeronautics and Space Administration.
Hansen, J., G. Russell, A. Lacis, I. Fung, D Rind, and P. Stone, 1985: Climate response times: Dependence on climate sensitivity and ocean mixing. *Science*, **229**, 857-859, doi:10.1126/science.229.4716.857.
Hansen, J., A. Lacis, and D. Rind, 1984: Climate trends due to increasing greenhouse gases. In *Proceedings of the Third Symposium on Coastal and Ocean Management, ASCE/San Diego, California, June 1-4, 1983*, pp. 2796-2810.
Hansen, J., A. Lacis, D. Rind, G. Russell, P. Stone, I. Fung, R. Ruedy, and J. Lerner, 1984: Climate sensitivity: Analysis of feedback mechanisms. In *Climate Processes and Climate Sensitivity*, AGU Geophysical Monograph 29, Maurice Ewing Vol. 5. J.E. Hansen and T. Takahashi, Eds. American Geophysical Union, pp. 130-163.
Hansen, J.E., and T. Takahashi (Eds.), 1984: *Climate Processes and Climate Sensitivity*. AGU Geophysical Monograph 29, Maurice Ewing Vol. 5. American Geophysical Union.
Rind, D., R. Suozzo, A. Lacis, G. Russell, and J. Hansen, 1984: *21 Layer Troposphere-Stratosphere Climate Model*. NASA TM-86183. National Aeronautics and Space Administration.
Hansen, J., V. Gornitz, S. Lebedeff, and E. Moore, 1983: Global mean sea level: Indicator of climate change? *Science*, **219**, 997.
Hansen, J., G. Russell, D. Rind, P. Stone, A. Lacis, S. Lebedeff, R. Ruedy, and L. Travis, 1983: Efficient three-dimensional global models for climate studies: Models I and II. *M. Weather Rev.*, **111**, 609-662, doi:10.1175/1520-0493(1983)111<0609:ETDGMF>2.0.CO;2.
Hansen, J., D. Johnson, A. Lacis, S. Lebedeff, P. Lee, D. Rind, and G. Russell, 1983: Climatic effects of atmospheric carbon dioxide. *Science*, **220**, 874-875, doi:10.1126/science.220.4599.874-a.
Pinto, J.P., D. Rind, G.L. Russell, J.A. Lerner, J.E. Hansen, Y.L. Yung, and S. Hameed, 1983: A general circulation model study of atmospheric carbon monoxide. *J. Geophys. Res.*, **88**, 3691-3702.
Gornitz, V., S. Lebedeff, and J. Hansen, 1982: Global sea level trend in the past century. *Science*, **215**, 1611-1614, doi:10.1126/science.215.4540.1611.

Hansen, J., D. Johnson, A. Lacis, S. Lebedeff, P. Lee, D. Rind, and G. Russell, 1981: Climate impact of increasing atmospheric carbon dioxide. *Science*, **213**, 957-966, doi:10.1126/science.213.4511.957.
Lacis, A., J. Hansen, P. Lee, T. Mitchell, and S. Lebedeff, 1981: Greenhouse effect of trace gases, 1970-1980. *Geophys. Res. Lett.*, **8**, 1035-1038.
Hansen, J., 1980: Book review of *Theory of Planetary Atmospheres* by J.W. Chamberlain. *Icarus*, **41**, 175-176.
Hansen, J.E., A.A. Lacis, P. Lee, and W.-C. Wang, 1980: Climatic effects of atmospheric aerosols. *Ann. New York Acad. Sciences*, **338**, 575-587.
Kawabata, K., D.L. Coffeen, J.E. Hansen, W.A. Lane, Mko. Sato, and L.D. Travis, 1980: Cloud and haze properties from Pioneer Venus polarimetry. *J. Geophys. Res.*, **85**, 8129-8140.
Sato, Mki., and J.E. Hansen, 1979: Jupiter's atmospheric composition and cloud structure deduced from absorption bands in reflected sunlight. *J. Atmos. Sci.*, **36**, 1133-1167, doi:10.1175/1520-0469(1979)036<1133:JACACS>2.0.CO;2
Travis, L.D., D.L. Coffeen, A.D. Del Genio, J.E. Hansen, K. Kawabata, A.A. Lacis, W.A. Lane, S.A. Limaye, W.B. Rossow, and P.H. Stone, 1979: Cloud images from the Pioneer Venus orbiter. *Science*, **205**, 74-76, doi:10.1126/science.205.4401.74.
Travis, L.D., D.L. Coffeen, J.E. Hansen, K. Kawabata, A.A. Lacis, W.A. Lane, S.A. Limaye, and P.H. Stone, 1979: Orbiter cloud photopolarimeter investigation. *Science*, **203**, 781-785, doi:10.1126/science.203.4382.781.
Hansen, J.E., W.-C. Wang, and A.A. Lacis, 1978: Mount Agung eruption provides test of a global climatic perturbation. *Science*, **199**, 1065-1068, doi:10.1126/science.199.4333.1065.
Knollenberg, R.G., J. Hansen, B. Ragent, J. Martonchik, and M. Tomasko, 1977: The clouds of Venus. *Space Sci. Rev.*, **20**, 329-354, doi:10.1007/BF02186469.
Lillie, C.F., C.W. Hord, K. Pang, D.L. Coffeen, and J.E. Hansen, 1977: The Voyager mission Photopolarimeter Experiment. *Space Sci. Rev.*, **21**, 159-181, doi:10.1007/BF00200849.
Sato, Mki., K. Kawabata, and J.E. Hansen, 1977: A fast invariant imbedding method for multiple scattering calculations and an application to equivalent widths of CO_2 lines on Venus. *Astrophys. J.*, **216**, 947-962.
Schubert, G., C.C. Counselman, III, J. Hansen, S.S. Limaye, G. Pettengill, A. Seiff, I.I. Shapiro, V.E. Suomi, F. Taylor, L. Travis, R. Woo, and R.E. Young, 1977: Dynamics, winds, circulation and turbulence in the atmosphere of Venus. *Space Sci. Rev.*, **20**, 357-387, doi:10.1007/BF02186459.
Kawata, Y., and J.E. Hansen, 1976: Circular polarization of sunlight reflected by Jupiter. In *Jupiter: Studies of the Interior, Atmosphere, Magneteosphere, and Satellites*. T. Gehrels, Ed. University of Arizona Press, pp. 516-530.
Somerville, R.C.J., W.J. Quirk, J.E. Hansen, A.A. Lacis, and P.H. Stone, 1976: A search for short-term meteorological effects of solar variability in an atmospheric circulation model. *J. Geophys. Res.*, **81**, 1572-1576.
Wang, W.-C., Y.L. Yung, A.A. Lacis, T. Mo, and J.E. Hansen, 1976: Greenhouse effects due to man-made perturbation of trace gases. *Science*, **194**, 685-690, doi:10.1126/science.194.4266.685
Hansen, J.E. (Ed.), 1975: *The Atmosphere of Venus*. NASA SP-382. National Aeronautics and Space Administration.
Hansen, J.E., and D. Coffeen, 1975: Analysis of cloud polarization measurements. Conference on Cloud Physics, Tucson, Ariz., October 21-24, 1974, Proceedings. (A75-44379 22-47) Boston, American Meteorological Society, 1975, p. 350-356.
Kawabata, K., and J.E. Hansen, 1975: Interpretation of the variation of polarization over the disk of Venus. *J. Atmos. Sci.*, **32**, 1133-1139, doi:10.1175/1520-0469(1975)032<1133:IOTVOP>2.0.CO;2
Coffeen, D., and J.E. Hansen, 1974: Polarization studies of planetary atmospheresa. In *Planets, Stars and Nebulae Studied with Photopolarimetry* (T. Gehrels, Ed. pp. 1133) University of Arizona Press, Tucson, AZ, p. 518-581. doi: 10.2307/j.ctt2050vsn View EBook
Hansen, J.E., and J.W. Hovenier, 1974: Interpretation of the polarization of Venus. *J. Atmos. Sci.*, **31**, 1137-1160, doi:10.1175/1520-0469(1974)031<1137:IOTPOV>2.0.CO;2.
Hansen, J.E., and J.W. Hovenier, 1974b: Nature Venus Clouds as Derived from Their Polarzation in *Exploration of the planetary system*; Proceedings of the Symposium, Torun, Poland, September 5-8, 1973. (A75-21276 08-91) Dordrecht, D. Reidel Publishing Co., 1974, p. 197-200. Research supported by the Nederlandse Organisatie voor Zuiver-Wetenschappelijk Onderzoek; Bibliographic Code: 1974IAUS...65..197H
Hansen, J.E., and L.D. Travis, 1974: Light scattering in planetary atmospheres. *Space Sci. Rev.*, **16**, 527-610, doi:10.1007/BF00168069.
Lacis, A.A., and J.E. Hansen, 1974: A parameterization for the absorption of solar radiation in the Earth's atmosphere. *J. Atmos. Sci.*, **31**, 118-133, doi:10.1175/1520-0469(1974)031<0118:APFTAO>2.0.CO;2.
Lacis, A.A., and J.E. Hansen, 1974: Atmosphere of Venus: Implications of Venera 8 sunlight measurements. *Science*, **184**, 979-983, doi:10.1126/science.184.4140.979.
Somerville, R.C.J., P.H. Stone, M. Halem, J.E. Hansen, J.S. Hogan, L.M. Druyan, G. Russell, A.A. Lacis, W.J. Quirk, and J. Tenenbaum, 1974: The GISS model of the global atmosphere. *J. Atmos. Sci.*, **31**, 84-117, doi:10.1175/1520-

0469(1974)031<0084:TGMOTG>2.0.CO;2.
Coffeen, D., and J.E. Hansen, 1973: Airborne infrared polarimetry. In *International Symposium on Remote Sensing of Environment*, 8th, Ann Arbor, Mich., October 2-6, 1972, Proceedings. **1**. (A73-39829 20-13) Ann Arbor, Mich., Environmental Research Institute of Michigan, 1973, 515-522. NASA-supported research.
Whitehill, L.P., and J.E. Hansen, 1973: On the interpretation of the "inverse phase effect" for CO_2 equivalent widths on Venus. *Icarus*, **20**, 146-152, doi:10.1016/0019-1035(73)90047-X.
Hansen, J.E., and D. Coffeen, 1972: Polarization of near-infrared sunlight reflected by terrestrial clouds. Conference on Atmospheric Radiation, Fort Collins, Colo., August 7-9, 1972, Preprints. (A73-10351 01-13) Boston, American Meteorological Society, 1972, p. 55-60.
Hansen, J.E., 1971: Multiple scattering of polarized light in planetary atmospheres. Part I. The doubling method. *J. Atmos. Sci.*, **28**, 120-125, doi:10.1175/1520-0469(1971)028<0120:MSOPLI>2.0.CO;2.
Hansen, J.E., 1971: Multiple scattering of polarized light in planetary atmospheres. Part II. Sunlight reflected by terrestrial water clouds. *J. Astmos. Sci.*, **28**, 1400-1426, doi:10.1175/1520 0469(1971)028<1400:MSOPLI>2.0.CO;2.
Hansen, J.E., 1971: Circular polarization of sunlight reflected by clouds. *J. Atmos. Sci.*, **28**, 1515-1516, doi:10.1175/1520-0469(1971)028<1515:CPOSRB>2.0.CO;2.
Hansen, J.E., and A. Arking, 1971: Clouds of Venus: Evidence for their nature. *Science*, **171**, 669-672, doi:10.1126/science.171.3972.669.
Hansen, J.E., and J.W. Hovenier, 1971: The doubling method applied to multiple scattering of polarized light. *J. Quant. Spectrosc. Radiat. Transfer*, **11**, 809-812, doi:10.1016/0022-4073(71)90057-4.
Liou, K.-N., and J.E Hansen, 1971: Intensity and polarization for single scattering by polydisperse spheres: A comparison of ray optics and Mie theory. *J. Atmos. Sci.*, **28**, 995-1004, doi:10.1175/1520-0469(1971)028<0995:IAPFSS>2.0.CO;2.
Hansen, J.E., and J.B. Pollack, 1970: Near-infrared light scattering by terrestrial clouds. *J. Atmos. Sci.*, **27**, 265-281, doi:10.1175/1520-0469(1970)027<0265:NILSBT>2.0.CO;2.
Hansen, J.E., 1969: Absorption-line formation in a scattering planetary atmosphere: A test of Van de Hulst's similarity relations. *Astrophys. J.*, **158**, 337-349.
Hansen, J.E., 1969: Exact and approximate solutions for multiple scattering by cloud and hazy planetary atmospheres. *J. Atmos. Sci.*, **26**, 478-487, doi:10.1175/1520-0469(1969)026<0478:EAASFM>2.0.CO;2.
Hansen, J.E., 1969: Radiative transfer by doubling very thin layers. *Astrophys. J.*, **155**, 565-573, doi:10.1086/149892.
Hansen, J.E., and H. Cheyney, 1969: Theoretical spectral scattering of ice clouds in the near infrared. *J. Geophys. Res.*, **74**, 3337-3346.
Hansen, J.E., and H. Cheyney, 1968: Near infrared reflectivity of Venus and ice clouds. *J. Atmos. Sci.*, **25**, 629-633, doi:10.1175/1520-0469(1968)025<0629:NIROVA>2.0.CO;2.
Hansen, J.E., and H. Cheyney, 1968: Comments on the paper by D.G. Rea and B.T. O'Leary, "On the composition of the Venus clouds". *J. Geophys. Res.*, **73**, 6136-6137, doi:10.1029/JB073i018p06136.
Hansen, J.E., and S. Matsushima, 1967: The atmosphere and surface temperature of Venus: A dust insulation model. *Astrophys. J.*, **150**, 1139-1157.
Hansen, J.E., and S. Matsushima, 1966: Light illuminance and color in the Earth's shadow. *J. Geophys. Rev.*, **71**, 1073-1081, doi:10.1029/JZ071i004p01073.
Matsushima, S., J.R. Zink, and J.E. Hansen, 1966: Atmospheric extinction by dust particles as determined from three-color photometry of the lunar eclipse of 19 December 1964. *Astron. J.*, **71**, 103-110.