

James E. Hansen

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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/~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	<i>Time Magazine</i> 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	<i>Foreign Policy</i> 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. Eufrazio, 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 negative CO2 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. Zochos, 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 Quére, 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. Hönlisch, 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. Joswita, 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., M. Sato, P. Kharecha, D. Beerling, R. Berner, V. Masson-Delmotte, M. Pagani, M. Raymo, D.L. Royer, and J.C. Zachos, 2008: [Target atmospheric CO₂: 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 CO₂ 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., M. 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., M. 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 CO₂-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 NO₂, O₃, 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. Lueckert, 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 CO₂ 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, Magnetosphere, 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 atmospheres](#). 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 Polarization](#) 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. Druryan, 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 CO₂ 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. Atmos. 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. Res.*, **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.