

## James E. Hansen

NASA Goddard Institute for Space Studies  
2880 Broadway, New York, NY 10025

(212) 678-5500 (Fax 5622)  
[jhansen@giss.nasa.gov](mailto:jhansen@giss.nasa.gov)

---

### **1-paragraph bio/introduction:**

Dr. James Hansen heads the NASA Goddard Institute for Space Studies in New York City and is Adjunct Professor of Earth and Environmental Sciences at Columbia University's Earth Institute. 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 the actions that the public must take to protect the future of young people and the other species on the planet.

### **3-paragraph bio:**

Dr. James Hansen directs the NASA Goddard Institute for Space Studies in New York City and is Adjunct Professor of Earth Sciences at Columbia University's Earth Institute. He was trained in physics and astronomy in the space science program of Dr. James Van Allen at the University of Iowa, receiving his 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/?8ecel33ccmg8l>

# James E. Hansen

NASA Goddard Institute for Space Studies  
2880 Broadway, New York, NY 10025

(212) 678-5500 (Fax 5622)  
jhansen@giss.nasa.gov

---

## **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-present	Director: NASA Goddard Institute for Space Studies
1985-present	Adjunct Professor: Earth and Environmental Sciences, 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	Editor' 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'
2007	Laureate, Dan David Prize for Outstanding Achievements & Impacts in Quest for Energy

## James E. Hansen

NASA Goddard Institute for Space Studies  
2880 Broadway, New York, NY 10025

(212) 678-5500 (Fax 5622)  
jhansen@giss.nasa.gov

---

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

### **Selected Publications:**

- Hansen, J., M. Sato: Paleoclimate Implications for Human-Made Climate Change. *arXiv:1105.0968v1*.
- Hansen, J., M. Sato, P. Kharecha, K. von Schuckmann, 2011: Earth's energy imbalance and implications. *arXiv: 1105.1140*.
- Hansen, J. et al. 2011: The case for young people and nature: A path to a healthy, natural, prosperous future. [http://www.columbia.edu/~jeh1/mailings/2011/20110505\\_CaseForYoungPeople.pdf](http://www.columbia.edu/~jeh1/mailings/2011/20110505_CaseForYoungPeople.pdf)
- Kharecha, P.A., C.F. Kutscher, J.E. Hansen, and E. Mazria, 2010: Options for near-term phaseout of CO<sub>2</sub> emissions from coal use in the United States. *Environ. Sci. Technol.*, 44, 4050-4062, doi:10.1021/es903884a.
- Hansen, J., R. Ruedy, Mki. Sato, and K. Lo, 2010: Global surface temperature change. *Rev. Geophys.*, 48, RG4004, doi:10.1029/2010RG000345.
- 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<sub>2</sub>: 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<sub>2</sub> 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., 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., 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:10.1088/1748-9326/2/2/024002.
- 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.

## James E. Hansen

NASA Goddard Institute for Space Studies  
2880 Broadway, New York, NY 10025

(212) 678-5500 (Fax 5622)  
jhansen@giss.nasa.gov

---

- 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<sub>2</sub>-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.

## James E. Hansen

NASA Goddard Institute for Space Studies  
2880 Broadway, New York, NY 10025

(212) 678-5500 (Fax 5622)  
jhansen@giss.nasa.gov

---

- 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.

## James E. Hansen

NASA Goddard Institute for Space Studies  
2880 Broadway, New York, NY 10025

(212) 678-5500 (Fax 5622)  
jhansen@giss.nasa.gov

---

- Lacis, A.A., B.E. Carlson, and J.E. Hansen, 2000: Retrieval of atmospheric NO<sub>2</sub>, O<sub>3</sub>, 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., 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: Climats 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.

## James E. Hansen

NASA Goddard Institute for Space Studies  
2880 Broadway, New York, NY 10025

(212) 678-5500 (Fax 5622)  
jhansen@giss.nasa.gov

---

- 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., 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.
- 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.

## James E. Hansen

NASA Goddard Institute for Space Studies  
2880 Broadway, New York, NY 10025

(212) 678-5500 (Fax 5622)  
jhansen@giss.nasa.gov

---

- Hansen, J.E., 1986: Geophysics: Global sea level trends. *Nature*, **313**, 349-350.
- 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.
- 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. Ragert, 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/BF02000849.
- 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<sub>2</sub> 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.

## James E. Hansen

NASA Goddard Institute for Space Studies  
2880 Broadway, New York, NY 10025

(212) 678-5500 (Fax 5622)  
jhansen@giss.nasa.gov

---

- 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.
- 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.
- 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 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.
- Whitehill, L.P., and J.E. Hansen, 1973: On the interpretation of the "inverse phase effect" for CO<sub>2</sub> equivalent widths on Venus. *Icarus*, **20**, 146-152, doi:10.1016/0019-1035(73)90047-X.
- 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.
- 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 S. Matsushima, 1967: The atmosphere and surface temperature of Venus: A dust insulation model. *Astrophys. J.*, **150**, 1139-1157.
- 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.