

Curriculum Vita
Steven C. Wofsy

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Professional Experience

February, 1997 - present.: Abbott Lawrence Rotch Professor of Atmospheric and Environmental Sciences, Division of Engineering and Applied Sciences, and Department of Earth and Planetary Sciences (EPS), Harvard University.

February, 1995 to February 1997. Gordon McKay Professor of Atmospheric and Environmental Sciences Division of Applied Sciences and Department of Earth and Planetary Sciences, Harvard University.

July 1982 to February 1995. Senior Research Fellow, Division of Engineering and Applied Physics, Harvard University.

July 1990 to present. Associate of the Harvard Forest, Harvard University.

July 1977 to June 1982. Associate Professor of Atmospheric Chemistry, Division of Engineering and Applied Physics, Harvard University.

September 1973 to June 1977. Lecturer on Atmospheric Chemistry and Research Fellow in the Center for Earth and Planetary Physics, Division of Engineering and Applied Physics, Harvard University.

Visiting Appointments (recent)

March, 2016. August-Wilhelm Scheer Visiting Professor, Technical University of Munich.

October, 2016. Miller Visiting Professor, University of California, Berkeley, CA.; H. S. Johnston lecture

Education

University of Chicago, Chicago, Illinois. B.S. (with honors) in Chemistry, 1966.

Harvard University, Cambridge, MA. M.A. in Chemistry, 1967, Ph.D. in Chemistry, 1971

Scientific Societies

American Association for the Advancement of Science (Fellow)

American Geophysical Union (Fellow)

Awards and Honors

James B. MacIlwane Award, American Geophysical Union, 1982.
Harvard University, Ledlie Prize for experimental and theoretical investigation of ozone depletion in the stratosphere, 1989.
Distinguished Public Service Medal, NASA, June, 2001.
National Academy of Sciences, 2011.
Revelle Medal, American Geophysical Union, 2012

Committees (selected)

NASA Earth System Science and Applications Advisory Committee 1995-2000, chair, 1997-1999, NASA Advisory Council, 1997-1999.
Carbon Cycle Science Plan Working Group, co-chair, 1998-1999, North American Carbon Program writing group, chair, 2001-2003.
Carbon Cycle Science Steering Group, 2001—2003.
MEDEA, 1996-2000, 2008-2013.
Intergovernmental Panel on Climate Change, Working Group I, Lead Author (Chapter 7), 2005—2006.

Lead Scientist or Lead P.I.: aircraft measurement programs in the atmosphere

- Atmospheric Boundary Layer Experiments (NASA Electra, 1985, 1987, Brazil).
- Stratospheric Photochemistry, Aerosol, and Dynamics Experiment (NASA ER-2, 1992-3).
- Stratospheric Tracers of Atmospheric Transport (STRAT, NASA ER-2 platform, 1995-7).
- CO₂ Boundary-layer Regional Atmospheric Study (COBRA, UND Citation 2, 1999-2000).
- CO₂ Boundary-layer Regional Atmospheric Study- North American Carbon Program, Canada-US: Preliminary Study (May - June 2003).
- CO₂ Boundary-layer Regional Atmospheric Study-Maine (COBRA, U. Wyoming King Air, 2004)
- Tropical Composition, Clouds, and Climate Experiment (WB-57F platform scientist, 2007).
- "Balanço Atmosférico Regional de Carbono na Amazônia" (BARCA, 2008-9, Brazil).
- HIAPER Pole-to-Pole Observations (NSF, 2009-2011). Lead PI.
- *Atmospheric Tomography Experiment (ATom, NASA 2015—2020); Lead PI.*

Educational activities

Educational Policy Committee, Faculty of Arts and Sciences, 2006.
Head Tutor, Earth and Planetary Sciences, 2006-2010.
Lead author, Annenberg Foundation secondary school curriculum, “Habitable Planet”, Ch2, 2006-2007.
Principal instructor, “The Atmosphere” (Science A Core, Harvard University), 1995-2009, “Introduction to Environmental Science”, 2010-2011, “The Fluid Earth” (2012-2013).
Committee on Research Policy, Chair, Faculty of Arts and Sciences (2009-2011).
Area Dean, Environmental Science and Engineering, Harvard School of Engineering and Applied Science (2009-2015).

Publications

1970

Wofsy, S. C., J.S. Muentner and W.A. Klemperer. Hyperfine structure and dipole moment of CH₃
D. *J. Chem. Phys.* 53, 4005-4014, 1970.

1971

McConnell, J.C., S. C. Wofsy, and M.B. McElroy, Natural sources of atmospheric CO. *Nature*
233: 187-188, 1971.

Wofsy, S. C., P. Davies, R. Neumann and W.A. Klemperer, Radiofrequency spectrum of
phosphine. *J. Chem. Phys.* 55: 3564-3568, 1971.

Wofsy, S. C., J.S. Muentner and W.A. Klemperer, Determination of hyperfine constants and
nuclear shielding in methyl fluoride and comparison with other molecules. *J. Chem. Phys.* 55:
2014-2019, 1971.

Wofsy, S. C., R.H.G. Reid and A. Dalgarno, Spin-change scattering of C II and O I by atomic H.
Astrophys. J. 168: 161-167, 1971.

1972

Bergeman, T.H., and S. C. Wofsy, Fine structure of O₂ (B ³Σ_u⁻) Chem. Phys. Lett. 15: 104-107,
1972.

Wofsy, S. C., J.C. McConnell and M.B. McElroy, Atmospheric CH₄, CO and CO₂. *J. Geophys.*
Res. 77, 4477-4493, 1972.

1973

Wofsy, S. C., and M.B. McElroy, On vertical mixing in the upper stratosphere and lower
mesosphere. *J. Geophys. Res.* 78, 2619-2624, 1973.

1974

Fang, T.M., A. Dalgarno and S. C. Wofsy, Opacity distribution functions and absorption in the
Schumann-Runge bands of molecular oxygen. *Planet. Space Sc.* 22, 413- 425, 1974.

McElroy, M.B., and S. C. Wofsy, HO_x, NO_x and ClO_x: Their role in atmospheric
photochemistry. *Can. J. Chem.* 52, 1582-1591, 1974.

McElroy, M.B., J.E. Penner, S. C. Wofsy, and J.C. McConnell. Atmospheric ozone: Possible
impact of stratospheric aviation. *J. Atmos. Sci.* 31, 287-303, 1974.

1975

McElroy, M.B. S. C. Wofsy, and Y.L. Yung, Atmospheric halocarbons: A discussion with
emphasis on chloroform. *Geophys. Res. Lett.* 2: 397-399, 1975.

McElroy, M.B., S. C. Wofsy, and N.D. Sze, Freon consumption: Implications for atmospheric
ozone. *Science* 187, 535-537, 1975.

Wofsy, S. C. M.B. McElroy and Y.L. Yung, The chemistry of atmospheric bromine. *Geophys.*
Res. Lett. 2, 215-219, 1975.

Wofsy, S. C., and N.D. Sze, Venus Cloud Models. *Atmospheres of the Earth and Planets*, B.M.
McCormac, editor, p. 369-384, 1975.

1976

McElroy, M.B., J.W. Elkins, S. C. Wofsy and Y.L. Yung Sources and sinks for atmospheric
N₂O. *Rev. of Geophys. and Space Phys.* 14, 143-150, 1976.

Wofsy, S. C., Interactions of CH₄ and CO in the Earth's atmosphere. *Ann. Rev. Earth and Plan.*
Sci. 4, 441-469, 1976.

1977

McElroy, M.B., S. C. Wofsy, and Y.L. Yung, The nitrogen cycle: Perturbations due to man and

- their impact on atmospheric N₂O and O₃. *Phil. Trans. Roy. Soc.* 277, 159-181, 1977.
- Penner, J.E., S. C. Wofsy, and M.B. McElroy, Sources and sinks for atmospheric H₂: A current analysis with projections for the influence of anthropogenic activity. *Planet. Space Sci.* 25, 521-540, 1977.
- Wofsy, S. C., and M.B. McElroy. Auroral recombination of N and O: A possible source for emission in the γ and δ bands of NO. *Planet. Space Sci.* 25, 1021-1026, 1977.

1978

- Elkins, J.W. S. C. Wofsy, M.B. McElroy, C.E. Kolb and W.A. Kaplan. Aquatic sources and sinks for nitrous oxide. *Nature* 275, 602-606, 1978.
- Kaplan, W.A., J.W. Elkins, S. C. Wofsy, C.E. Kolb, M.B. McElroy and A. P. Duran. Nitrous oxide in fresh water systems: An estimate for the yield of atmospheric N₂O associated with disposal of human waste. *Pageoph.* 116, 423-438, 1978.
- Logan, J.A., S. C. Wofsy, M.J. Prather and M.B. McElroy. Atmospheric chemistry: Response to human influence. *Phil. Trans. Roy. Soc.* 290, 187-234, 1978.
- Wofsy, S. C., M.B. McElroy, J.W. Elkins, C.E. Kolb, A. P. Duran and W. A. Kaplan. Production and release of N₂O from the Potomac Estuary. *Limnol. Oceanogr.* 23, 1168-1182, 1978.
- Wofsy, S. C., Temporal and latitudinal variations of stratospheric trace gases: A critical comparison between theory and experiment. *J. Geophys. Res.* 8, 364-378, 1978.

1979

- Logan, J.A., S. C. Wofsy, M.B. McElroy, and M.J. Prather. Oxidation of CS₂ and COS: sources for atmospheric SO₂. *Nature*, 281, 188-189, 1979.
- Prather, M.J., S. C. Wofsy, M.B. McElroy, and J.A. Logan. Stratospheric chemistry: multiple solutions. *Geophys. Res. Lett.*, 6, 163-165, 1979.

1980

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- McElroy, M.B., N. Dak Sze, and S. C. Wofsy. Photochemical sources for atmospheric H₂S. *Atmospheric Environ.* 14: 159-163, 1980.

1981

- Lipschultz, F., S. C. Wofsy, O.C. Zafiriou, M.B. McElroy, F.W. Valois and S.W. Watson. Production of NO and N₂O by soil nitrifying bacteria: a source of atmospheric nitrogen oxides. *Nature* 294, 641-643, 1981.
- Logan, J.A., M.J. Prather, S. C. Wofsy, and M.B. McElroy. Tropospheric chemistry: a global perspective. *J. Geophys. Res.* 86, 7210-7254, 1981.
- Wofsy, S. C., M.B. McElroy and J.W. Elkins. Transformations of nitrogen in a polluted estuary: nonlinearities in the demand for oxygen at low flow. *Science* 213, 754- 757, 1981.
- Wofsy, S. C., Nitrification and production of N₂O in the Potomac: evidence for variability. in *Estuaries and Nutrients*, Edited by B.J. Nielson and L.E. Cronin, Humana Press, p. 447-464, 1981.

1982

- Fox, J.L., S. C. Wofsy, M.B. McElroy, and M.J. Prather. A stratospheric chemical instability. *J. Geophys. Res.* 87, 11, 126-132, 1982.
- Wofsy, S. C. and J.A. Logan. Recent developments in stratospheric photochemistry. In *Causes and Effects of Stratospheric Ozone Depletion: An Update*. National Academy of Sciences,

pp. 167-205, 1982.

1983

- Fox, L.E., and S. C. Wofsy. Kinetics of removal of iron colloids from estuaries. *Geochim. Cosmochim. Acta* 47, 211-216.
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- Wofsy, S. C., A simple model to predict extinction coefficients and phytoplankton biomass in eutrophic waters. *Limnology and Oceanography*, 28, 1144-1155, 1983.
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1984

- Prather, M.J., S. C. Wofsy and M.B. McElroy. Reduction in Ozone at High Concentrations of Stratospheric Halogens. *Nature*, 312, 227-231, 1984.

1985

- Fox, L.E., S.L. Sager and S. C. Wofsy. The chemical control of soluble phosphorus in the Amazon River estuary. *Geochim. Cosmochim. Acta.*, 50, 783-794, 1985.
- Fox, L.E., S.L. Sager, and S. C. Wofsy. Factors controlling the concentrations of soluble phosphorus in the Mississippi estuary. *Limnology Oceanography*, 30: 826-832, 1985.
- Kaplan, W.A., and S. C. Wofsy. The biogeochemistry of nitrous oxide: a review. In, *Advances in Aquatic Microbiology, Vol. 3*, (H. Jansch and P. Le B. Williams, eds.), Wiley and Sons, 1985.
- Lipschultz, F., L.E. Fox and S. C. Wofsy. The effects of light and nutrients on rates of ammonium transformation in a eutrophic river. *Marine Chem.*, 16, 329-341, 1985.
- McElroy, M. B. and S. C. Wofsy. Tropical forests: interactions with the atmosphere. Symposium Volume, *Tropical forests and World Atmosphere*, AAAS Selected Symposium 101, pp. 33-60, 1985. (Ghilleen T. Prance, editor).

1986

- Keller, M., W.A. Kaplan, and S. C. Wofsy. Emissions of N₂O, CH₄ and CO₂ from tropical forest soils. *J. Geophys. Res.* 91: 11,791-11,802, 1986.
- Lipschultz, F., L.E. Fox, and S. C. Wofsy. Nitrogen metabolism of the eutrophic Delaware River ecosystem. *Limnology and Oceanography*, 3: 701-716, 1986.
- McElroy, M.B., S. C. Wofsy, and R.S. Salawitch. Antarctic O₃: An Assessment of Mechanisms for the Spring Decrease. *Geophys. Res. Lett.*, 13, 1296-1299, 1986.
- McElroy, M.B., S. C. Wofsy, R.S. Salawitch and J.A. Logan. Antarctic Ozone: Reductions due to synergistic interactions of chlorine and bromine. *Nature*, 321, 759- 762, 1986.

1987

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- Nitrous Oxide from Combustion. *J. Geophys. Res.*, 92, 3098-3104, 1987.
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- Jacob, D.J., M.J. Prather, S. C. Wofsy, and M.B. McElroy, Atmospheric Distribution of ^{85}Kr Simulated with a General Circulation Model. *J. Geophys. Res.*, 92 6614- 66626, 1987.
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1988

- Andreae, M.O., E.V. Browell, P.L. Silva Dias, M. Garstang, G.L. Gregory, R.C. Harriss, G.F. Hill, D.J. Jacob, M.C. Pereira, G.W. Sachse, A.W. Setzer, R.W. Talbot, and A.L. Torres, and S. C. Wofsy. Biomass Burning Emissions and Associated Haze Layers Over Amazonia. *J. Geophys. Res.*, 93, 1509-1527, 1988.
- Fox, L.E., M.B. McElroy, S. C. Wofsy, R.J. Salawitch, and M.J. Molina. Interactions between HCl, NO_x and H_2O Ice in the Antarctic Stratosphere: Implications for Ozone. *J. Geophys. Res.*, 93, 2442-2450, 1988.
- Jacob, D.J., and S. C. Wofsy. Photochemistry of Biogenic Emissions over the Amazon Forest. *J. Geophys. Res.*, 93, 1477-1486, 1988.
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- Keller, M., W. A. Kaplan, S. C. Wofsy, and Jose Maria Da Costa, Emissions of N_2O from tropical forest soils: response to fertilization with NH_4^+ , NO_3^- and PO_4^{-3} . *J. Geophys. Res.*, 93, 1600-1604, 1988.
- McElroy, M.B., S. C. Wofsy, and R.J. Salawitch. Chemistry of the Antarctic Stratosphere, *Planetary Space Science*, 36, 73-87, 1988.
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- Salawitch, R.J., S. C. Wofsy, and M.B. McElroy, Chemistry of OClO in the Antarctic Stratosphere: Implications for Bromine, *Planetary Space Science*, 36, 213- 224, 1988.
- Wofsy, S. C., R. C. Harriss and W. A. Kaplan. Carbon Dioxide in the Atmosphere over the Amazon Basin. *J. Geophys. Res.*, 93, 1377-1388, 1988.

1989

- Jacob, D.J., S. Sillman, J.A. Logan, and S. C. Wofsy. Least Independent Variables Method for Simulation of Tropospheric Ozone. *J. Geophys. Res.*, 94, 8497-8509, 1989.
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- Amazon Basin: river and forest sources. *J. Geophys. Res.* 15, 18,327-18,336, 1989.
- Salawitch, R. J., G.P. Gobbi, S. C. Wofsy and M.B. McElroy. Denitrification in the Antarctic Stratosphere. *Nature*, 339, 525-527, 1989.

1990

- Bakwin, P. S., S. Fan, and S. C. Wofsy. Measurements of Reactive Nitrogen Oxides (NO_y) within and Above a Tropical Forest Canopy in the Wet Season. *J. Geophys. Res.*, 95, 16,765-16,772, 1990.
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- Fan, S., S. C. Wofsy, P. S. Bakwin, and D. J. Jacob, and D. R. Fitzjarrald. Atmosphere-Biosphere Exchange of CO₂ and O₃ in the Central Amazon Forest. *J. Geophys. Res.* 95: 16,851-16,864, 1990.
- Gobbi, G.P., R.J. Salawitch, S. C. Wofsy, and M.B. McElroy. Nucleation of Nitric Acid Trihydrate Particles in the Polar Stratosphere. *J. Atmos. Sci.*, 47, 2004-2012, 1990.
- Jacob D. J., and S. C. Wofsy. Budgets of Reactive Nitrogen, Hydrocarbons, and Ozone Over the Amazon Forest During the Wet Season. *J. Geophys. Res.*, 95, 16,737-16,754, 1990.
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- Sillman, S., J. A. Logan, and S. C. Wofsy. A regional scale model for ozone in the United States with subgrid representation of urban and power plant plumes. *J. Geophys. Res.* 95: 5371-5748, 1990.
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1991

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1992

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- Jacob, D.J., S. C. Wofsy, P.S. Bakwin, S.M. Fan, R.C. Harriss, R.W. Talbot, J.D. Bradshaw, S.T. Sandholm, H.B. Singh, E.V. Browell, G.L. Gregory, G.W. Sachse, M. Shipman, D.R. Blake, and D.R. Fitzjarrald, Summertime Photochemistry of the Arctic Troposphere. *J. Geophys. Res.*, 97, 16,421-16,432.
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1993

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