

Eric D. Sofen

Education

- 2007–Present **Ph.D. student**, *Department of Atmospheric Sciences, University of Washington, Seattle, WA.*
Advised by Professor Becky Alexander
- 2003–2007 **B.A. in Physics**, *Bowdoin College, Brunswick, ME, Cum laude, with High Honors in Physics.*
Advised by Professor Mark Battle

Undergraduate Thesis

- Title *A Study of Gases in Arctic & Antarctic Firn*
- Supervisor Professor Mark Battle
- Description Computer modeling and analysis of the movement of gases through polar firn (snowpack), including a revision of the model code to account for higher snow accumulation rates at WAIS-Divide, Antarctica and Summit, Greenland sites; modeling the age distribution of firn air at WAIS-Divide; studying the carbon budget implied by South Pole firn air data. Awarded High Honors.

Research

- 2007–Present **Graduate Research Assistant**, *Department of Atmospheric Sciences, University of Washington, Professor Becky Alexander.*
Modeling of past atmospheric oxidant chemistry and the oxygen isotopes of nitrate and sulfate. Oxygen isotope measurements of nitrate and sulfate, with current work focused on improving methodology.
- 2006–2007 **Undergraduate Research Assistant**, *Department of Physics and Astronomy, Bowdoin College, Professor Mark Battle.*
Firn air modeling. Honor's thesis research.
- Summer 2005 **Undergraduate Research Assistant**, *Department of Physics and Astronomy, Bowdoin College, Professor Mark Battle.*
Construction, testing, and installation in the Harvard Forest (Petersham, MA) of the ArMADillo O₂-CO₂ measurement system.
- Summer 2004 **NSF Research Experience for Undergraduates**, *Materials Research Science and Engineering (NSF MRSEC) and the Rowland Institute, Harvard University, Single Molecule Biophysics Group (Dr. Amit Meller, PI).*
Summer research assistant studying translocation of DNA through α -hemolysin nanopores.

Other Academic Training

- 2010 **Initial Training Network in Mass-Independent Fractionation (INTRAMIF) Summer School**, *University of East Anglia, Norwich, UK.*

2007–2010 **Program on Climate Change Summer Institute**, *University of Washington*.
Topics: “Couplings between changes in the Climate System and Biogeochemistry,” “How does ocean circulation matter for climate change?,” “Climate Impacts on the Pacific Northwest: Present, Past, and Future,” and “Climate Feedbacks.”

Teaching

Winter 2009 **Teaching Assistant**, *Department of Atmospheric Sciences, University of Washington*.
Atmospheric Sciences 111: “Global Warming”

Spring 2006 **Tutor**, *Department of Physics and Astronomy, Bowdoin College*.
Physics 081: “Physics of the Environment”

2005–2006 **Grader**, *Department of Physics and Astronomy, Bowdoin College*.
Physics 103: Mechanics, and 104: Electricity and Magnetism

Awards & Honors

2007–2008 University of Washington Program On Climate Change Graduate Fellow

2007–2008 University of Washington Top Scholar

2007 Noel C. Little Prize in Experimental Physics

2007 Division III All-New England Track & Field Team (10,000 m)

2005–2007 NESAC All-Academic (6 seasons)

2005 Edwin Herbert Hall Prize in Physics

2003–2005 Sarah and James Bowdoin Scholar

2003 S. Lawrence Whipple Award and Scholarship for independent research in Lexington history, Lexington Historical Society

Science Outreach

March 2012 Polar Science Weekend at the Pacific Science Center (UW APL); developed a new demo on dust transport to Antarctica with P. Hezel and M. Zatzko.

March 2011 Polar Science Weekend at the Pacific Science Center (UW APL)

February 2010 Polar Science Weekend at the Pacific Science Center (UW APL)

July 2008 Boeing Environmental Fair (UW PCC)

Other Employment Experience

Summer 2006 **Avian Radar Project Technician**, *Wind Division, Woodlot Alternatives, Inc.*, Topsham, ME.

Summers 2001–2003 **Lifeguard**, *Lexington Recreation Department*, Lexington, MA.

Computer skills

Operating Systems Linux, Mac OS-X, Windows

Scientific Programming Fortran 77/95, IDL, MATLAB, Mathematica, LabView

Other Programming \LaTeX , HTML/CSS, Java (elementary), Git version control

Interests

Running I ran cross-country and track competitively in high school and college, and continue to race cross-country and on the road with the Seattle Running Club.

Cycling I am a year-round bike commuter, recreational rider, and bike tourist. In the summer of 2007, I bicycled across the United States from Massachusetts to Washington.

Publications

Papers

A. J. Schauer, S. Kunasek, E. Sofen, J. Erbland, J. Savarino, B. Johnson, H. Amos, T. Jackson, M. H. Thiemens, and B. Alexander, "Oxygen isotope exchange with quartz during pyrolysis of silver sulfate," *Rapid Commun. Mass. Sp.*, 2012. Submitted.

M. O. Battle, J. P. Severinghaus, E. D. Sofen, D. Plotkin, A. J. Orsi, M. Aydin, S. A. Montzka, T. Sowers, and P. P. Tans, "Controls on the movement and composition of firn air at the west antarctic ice sheet divide," *Atmospheric Chemistry and Physics*, vol. 11, no. 21, pp. 11007–11021, 2011.

E. D. Sofen, B. Alexander, and S. A. Kunasek, "The impact of anthropogenic emissions on atmospheric sulfate production pathways, oxidants, and ice core $\Delta^{17}\text{O}(\text{SO}_4^{2-})$," *Atmos. Chem. Phys.*, vol. 11, no. 7, pp. 3565–3578, 2011.

S. A. Kunasek, B. Alexander, E. J. Steig, E. D. Sofen, T. L. Jackson, M. H. Thiemens, J. R. McConnell, D. J. Gleason, and H. M. Amos, "Sulfate sources and oxidation chemistry over the past ~ 230 years from sulfur and oxygen isotopes of sulfate in a West Antarctic ice core," *J. Geophys. Res.*, vol. 115, no. D18313, 2010.

J. A. Mischler, T. A. Sowers, R. B. Alley, M. Battle, J. R. McConnell, L. Mitchell, T. Popp, E. Sofen, and M. K. Spencer, "Carbon and hydrogen isotopic composition of methane over the last 1000 years," *Glob. Biogeochem. Cy.*, 2009.

Conference Abstracts (Talks)

E. Sofen, B. Alexander, E. Steig, M. Thiemens, S. Kunasek, H. Amos, A. Schauer, M. Hastings, J. Bautista, T. Jackson, L. Vogel, J. McConnell, and D. Pasteris, "Assessing the anthropogenic influence on atmospheric oxidants using the oxygen isotopic composition of sulfate and nitrate from the wais-divide ice core," in *Geophysical Research Abstracts*, vol. 14 of *EGU General Assembly 2012*, European Geosciences Union, 2012.

E. D. Sofen, B. Alexander, E. J. Steig, M. H. Thiemens, S. A. Kunasek, A. J. Schauer, M. G. Hastings, J. Bautista, T. L. Jackson, and L. Vogel, "Interpretation of the wais-divide sulfate and nitrate $\Delta^{17}\text{O}$ record," in *WAIS Divide Science Meeting*, (La Jolla, California), Oct. 2010.

E. D. Sofen, B. Alexander, S. A. Kunasek, L. T. Murray, L. J. Mickley, J. O. Kaplan, and

G. A. Schmidt, "Sensitivity of oxygen isotopes of sulfate in ice cores to past atmospheric oxidants," in *5th International Symposium on Isotopomers*, June 2010.

E. D. Sofen and B. Alexander, "The sensitivity of the oxygen isotopes of sulfate to changes in oxidant concentrations during the preindustrial-industrial transition.," in *4th GEOS-Chem Scientific and User's Meeting*, Apr. 2009.

E. D. Sofen, S. A. Kunasek, B. Alexander, T. L. Jackson, M. H. Thiemens, E. J. Steig, and J. R. McConnell, "Isotopic composition of sulfate at wais-divide: Measurements and global chemical transport modeling," in *West Antarctic Ice Sheet Divide Science Meeting*, Oct. 2009.

Conference Abstracts (Posters)

E. D. Sofen, B. Alexander, E. J. Steig, M. H. Thiemens, S. A. Kunasek, A. J. Schauer, M. G. Hastings, J. Bautista, T. L. Jackson, L. Vogel, and H. M. Amos, "Variability of southern hemisphere oxidant chemistry constrained by isotopic measurements of sulfate and nitrate from the WAIS-Divide ice core," in *WAIS Divide Science Meeting*, (La Jolla, California), Oct. 2011.

E. Sofen, B. Alexander, E. Steig, M. Thiemens, S. Kunasek, A. Schauer, M. Hastings, J. Bautista, T. Jackson, L. Vogel, and H. Amos, "Interpreting the isotopic composition of sulfate and nitrate from an antarctic ice core using geos-chem," in *5th GEOS-Chem Scientific and User's Meeting*, (Harvard University), Apr. 2011.

E. D. Sofen, B. Alexander, E. J. Steig, M. H. Thiemens, S. A. Kunasek, A. J. Schauer, M. G. Hastings, J. Bautista, T. L. Jackson, and L. Vogel, "Understanding paleo-oxidants and the oxygen isotopes of sulfate and nitrate in the wais-divide ice core," in *Graduate Climate Conference*, (Pack Forest, Washington), University of Washington, Oct. 2010.

E. D. Sofen, B. Alexander, E. J. Steig, M. H. Thiemens, S. A. Kunasek, A. J. Schauer, M. G. Hastings, J. Bautista, T. L. Jackson, and L. Vogel, "Understanding the WAIS-Divide ice core sulfate and nitrate $\Delta^{17}\text{O}$," in *Initial Training Network in Mass Independent Fractionation Summer School*, Aug. 2010.

E. D. Sofen, B. Alexander, S. A. Kunasek, L. J. Mickley, L. T. Murray, and J. O. Kaplan, "Sensitivity of oxygen isotopes of sulfate in ice cores to past changes in atmospheric oxidant concentrations," in *Eos. Trans. AGU, 90(52)*, Fall Meeting Supplement, 2009. Abstract B13D-0545.

E. D. Sofen, B. Alexander, S. A. Kunasek, T. L. Jackson, and M. H. Thiemens, "Quantifying changes in paleo-oxidants using the oxygen isotopes of sulfate and geos-chem," in *Graduate Climate Conference*, (Pack Forest, Washington), University of Washington Program on Climate Change, 2009.

A. Schauer, S. A. Kunasek, B. Alexander, E. J. Steig, E. D. Sofen, J. Bautista, L. Vogel, M. G. Hastings, and J. C. Jarvis, "Reduced size limits for nitrate $\delta^{15}\text{N}$, $\Delta^{17}\text{O}$ and sulfate $\Delta^{17}\text{O}$ isotope measurements and first results from the WAIS Divide Core," in *West Antarctic Ice Sheet Divide Science Meeting*, 2009.

E. D. Sofen and B. Alexander, "The sensitivity of the oxygen isotopes of ice core sulfate to changes in climate and chemistry: Implications for the quantitative interpretation of

the oxidizing capacity of the paleo-atmosphere,” in *Eos Trans. AGU*, 88(52), Fall Meeting Supplement, Dec. 2008. Abstract PP51C-1511.

Conference Abstracts (Other Presenters)

L. T. Murray, L. J. Mickley, J. O. Kaplan, E. D. Sofen, B. Alexander, D. B. Jones, and D. J. Jacob, “Evolution of the oxidative capacity of the troposphere since the Last Glacial Maximum,” in *Eos. Trans. AGU*, 90(52), Fall Meeting Supplement, 2009. Abstract A53E-03.

E. D. Sofen, S. A. Kunasek, B. Alexander, E. J. Steig, D. J. Gleason, T. L. Jackson, M. H. Thiemens, and M. G. Hastings, “Evaluating the sensitivity of nitrate and sulfate $\Delta^{17}\text{O}$ to changes in atmospheric oxidant concentrations on the preindustrial-industrial timescale,” in *Geophysical Research Abstracts*, vol. 11 of *EGU General Assembly 2009*, 2009.

M. O. Battle, Z. A. Davis, R. Hart, E. Sofen, R. Perry, J. Woogerd, J. Scheckman, and J. Carpenter, “Measurements of the ecosystem $\text{O}_2 - \text{CO}_2$ stoichiometry at Harvard Forest,” in *2nd NACP All-Investigators Meeting*, Dec. 2008.

M. Aydin, E. S. Saltzman, M. B. Williams, E. D. Sofen, and M. O. Battle, “Measurements of light alkanes ($\text{C}_2\text{-C}_4$) in firn air at Summit, Greenland and West Antarctic Ice Sheet Divide, Antarctica: Is there evidence for a recent decline in polar tropospheric levels?,” in *ESRL Global Monitoring Annual Conference: Oral Abstracts*, May 2008.

M. O. Battle, J. P. Severinghaus, S. A. Montzka, E. D. Sofen, and P. P. Tans, “Firn-air properties and influences at the West Antarctic Ice Sheet Divide,” in *Eos. Trans. AGU*, 88(52), Fall Meeting Supplement, Dec. 2007. Abstract A53B-1167.

R. Hart, M. O. Battle, E. D. Sofen, R. Perry, and J. Carpenter, “In situ measurements of atmospheric O_2 and CO_2 in a central Massachusetts forest,” in *Eos. Trans. AGU*, 88(52), Fall Meeting Supplement, Dec. 2007. Abstract B43D-1578.

E. S. Saltzman, M. Aydin, M. B. Williams, E. D. Sofen, and M. O. Battle, “Measurements of light alkanes ($\text{C}_2 - \text{C}_4$) in firn air at Summit, Greenland and West Antarctic Ice Sheet Divide, Antarctica: Is there evidence for a recent decline in polar tropospheric levels?,” in *Eos. Trans. AGU*, 88(52), Fall Meeting Supplement, Dec. 2007. Abstract A44B-05.