

## CURRICULUM VITAE

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Edward J. Brook  
College of Earth, Ocean, and Atmospheric Sciences  
104 CEOAS Administration Building  
Oregon State University  
Corvallis, OR  
541 737-8197  
[brooke@geo.oregonstate.edu](mailto:brooke@geo.oregonstate.edu)  
February 19, 2017

### EDUCATION

Ph.D. Chemical Oceanography, 1993. MIT/Woods Hole Oceanographic Institution.  
M.S. Geology, 1988. University of Montana.  
B.S. Geology, 1985. Duke University.

### POSITIONS

2008-present Professor, Oregon State University, College of Earth Ocean, and Atmospheric Sciences. Program Director for Geology, 2014-present.  
2004-2008 Associate Professor, Oregon State University, Department of Geosciences.  
2002-2004 Associate Professor, Washington State University, Department of Geology and Program in Environmental Science and Regional Planning.  
1996-2002 Assistant Professor, Washington State University, Department of Geology and Program in Environmental Science and Regional Planning.  
1996-1996 Post-Doctoral Investigator, Graduate School of Oceanography, University of Rhode Island. Supervisor: Dr. Michael Bender.  
1993-1995 NOAA Climate and Global Change Post-Doctoral Fellow, Graduate School of Oceanography, University of Rhode Island. Supervisor: Dr. Michael Bender.  
1988-1993 Research Assistant, MIT/Woods Hole Oceanographic Institution. Supervisor: Dr. Mark Kurz.  
1985-1993 Teaching Assistant/Research Assistant, Geology Department, University of Montana. Supervisor: Dr. Johnnie Moore.

### HONORS

Outstanding Promise in Geology Award, Duke University Department of Geology, 1985.  
Bertha Morton Graduate Scholarship, University of Montana, 1987.  
Geological Society of America Outstanding Research Grant Proposal, 1988.  
National Defense Science and Engineering Graduate Fellowship, 1988-1992.  
NOAA Global and Climate Change Post-Doctoral Fellowship, 1993-1995.  
Dean's Award for Research Excellence, WSU, 1999.  
Editor's Citation for Excellence in Reviewing, *Journal of Geophysical Research*, 2001.  
Fellow, Frontiers in Science, National Academy of Sciences, 2002.  
Gary Comer Foundation Abrupt Climate Change Fellowship, 2004.  
Brook Glacier, Antarctica, named for service to polar science, 2006.  
Aldo Leopold Leadership Fellowship, 2008.  
Milton Harris Award for Basic Research, OSU College of Science, 2009  
Google Science Communication Fellowship, 2011.  
Fellow of the American Association for the Advancement of Science, 2011.  
Jack Dymond Memorial Excellence in Mentoring Award, OSU-CEOAS, 2013.  
Fellow of the American Geophysical Union, 2014.

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### PROFESSIONAL SOCIETIES

American Geophysical Union  
American Association for the Advancement of Science  
European Geophysical Union

### GRADUATE ADVISEES AND CURRENT POSITION

Brent Goehring	M.S. 2004-2006	Assistant Professor, Tulane University
Logan Mitchell	Ph.D. 2007-2012	Postdoc, University of Utah
Thomas Bauska	Ph.D. 2007-2013	Postdoc, Cambridge University
Julia Rosen	Ph.D. 2008-2014	Independent Science Journalist
Jon Edwards	Ph.D. 2011-present	
James Lee	Ph.D. 2011-present	
Andy Menking	Ph.D. 2013-present	

### POSTDOCTORAL ADVISEES AND CURRENT POSITION

Susan Harder	1997-2002	Instructor, Washington State Univ. (ret.)
Henriette Linge	2002-2003	Asst. Professor, Univ. of Bergen, Norway
Hinrich Schaefer	2005-2007	Scientist, NIWA, New Zealand
Jinho Ahn	2005-2008	Asst. Professor, Seoul National Univ., Korea
Alexi Grachev	2005- 2008	Asst. Professor, Siberian Federal Univ.
Shaun Marcott	2011-present	Asst. Professor, University of Wisconsin
Rachael Rhodes	2011-present	Marie Curie Fellow, University of Cambridge
Adrian Schilt	2012-2013	Swiss Federal Office for the Environment
Christo Buizert	2012-2016	Assistant Professor, OSU
Aron Buffen	2015-present	

### UNDERGRADUATE AND HIGH SCHOOL RESEARCH ADVISEES SINCE 1998

Undergraduate: Vanessa Stevens, Kim Guess, Aaron Goldner, Logan Mitchell, Jeremy Vore, Lauren Foiles, Lacey Little, Kurt Winner, Amber Zandanel, Nicole Rocco (summer REU), Victoria Scherelis, Casey Armanetti (summer REU), Marika Stock. High School: Claire Rodman

### MAJOR PROFESSIONAL SERVICE

U.S. Ice Core Working Group 2000-2002 (Chair, 2001-2002).  
International Partnerships in Ice Core Sciences, Steering Committee, 2003-present.  
Co-Chair, International Partnerships in Ice Core Sciences, 2005-present.  
West Antarctic Ice Sheet Divide Site Ice Core Project Executive Committee, 2004-present.  
NSF Earth System History Panel for Abrupt Climate Change Research Plan, Oct. 20-21 2004.  
Editor, Ice Core Section, Encyclopedia of Quaternary Sciences, 2005-2006; 2010-2011.  
Associate Editor, *Climate of the Past Discussions* (EGU Journal), 2005-present.  
Associate Editor, *Quaternary Science Reviews*, 2005-2010.  
Steering Committee, NSF Workshop on Paleoclimate Proxies, 2005.  
Lead Author, for US Climate Change Science Program Synthesis and Assessment Product 3.4, Abrupt Climate Change, Chapter 5, Abrupt Changes in Atmospheric Methane.  
NSF Office of Polar Programs Advisory Committee, 2005-2008.  
Ice Drilling Program Office, Senior Advisory Board, 2008-Present. Chair 2013-2016.  
NEEM Ice Core Steering Committee, co-chair Gas Consortium, 2007-present.

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Lead PI, NSF PIRE Award: International Collaboration and Education in Ice Core Sciences, 2010-present.

Canadian Ice Coring Program, International Advisory Board, 2015-present.

PAGES (Past Global Changes) Steering Committee, 2016-present.

Beyond EPICA Oldest Ice Project, Liason and Advisory Group, 2016-present.

### MAJOR UNIVERSITY, COLLEGE AND DEPARTMENT SERVICE

Chair, CEOAS External Award Committee, 2016-present.

Search Committee, CEOAS Dean, 2015-2016.

Chair, Faculty Senate Faculty Economic Welfare and Retirement Committee, 2015-2017

Program Director for Geology, CEOAS, 2014-present.

Search Committee, Earth System History Faculty Member, 2014, 2015.

Search Committee, High Latitude Cluster Hire, 2011-2012.

Undergraduate Program Committee, CEOAS, 2014-present.

Graduate Program Committee, CEOAS, 2014-present.

Strategic Planning and Hiring Committee, CEOAS, 2014-2015.

Peer Review of Teaching Committee, CEOAS, 2013-2014.

Faculty Hiring Committee CEOAS, 2011-2012.

Department of Geosciences, Advisory Committee, AY 2006-2007 (chair), 2007-2008.

Chair, Department of Geosciences Space Task Force, AY 2005-2006.

Department of Geoscience, Graduate Committee, AY 2005-2006.

Department of Geosciences, Curriculum Committee, AY 2007-2010.

### INVITED PRESENTATIONS AND KEYNOTE TALKS

AMQUA 1998 Biennial Meeting. Puerto Vallarta. Sept. 5-7, 1998.

American Museum of Natural History, Conference on Biodiversity and Climate Change: Conservation in the Face of an Uncertain Future. April 30-May 1, 1999.

Berkeley Atmospheric Sciences Center Atmospheric Sciences Symposium. Nov. 9, 2001.

Beckman/National Academy of Sciences 14<sup>th</sup> Annual Frontiers in Science Symposium. Nov. 14-16, 2002.

University of South Florida, Eminent Scholars Lecture Series on Abrupt Climate Change. Jan 27-28, 2004.

Leverhulme Symposium on Climate Change. Cambridge and London, UK. March 10-13 2008.

Seoul National University, South Korea, Distinguished Visiting Lecturer. May 2013.

Lifto Amundson Phi Beta Kappa Memorial Lecture, University of South Dakota. April 20, 2015.

Korean Polar Research Institute Annual Polar Symposium, Invited Speaker, May 2015

Plenary Lecture at the 2017 PAGES Open Science Meeting. May 2017, Zaragoza, Spain.

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### PUBLICATIONS

**Publications in Peer Reviewed Journals and Books (Graduate Student and Postdoc Authors in Bold, \*=student or postdoc collaborator for whom I was not major advisor)**

Google Scholar: h index 46, i10 index 104 (Feb 19 2017).

**Yau, A.M\***, Bender, M.L., Robinson, A. and Brook, E.J., 2016, Reconstructing the last interglacial at Summit, Greenland: Insights from GISP2, *Proceedings of the National Academy of Sciences*, 113(35), pp.9710-9715.

**Bauska, T.K., Baggenstos, D\***, Brook, E.J., Mix, A.C., **Marcott, S.A.**, Petrenko, V.V., Schaefer, H., Severinghaus, J.P. and **Lee, J.E.**, 2016, Carbon isotopes characterize rapid changes in atmospheric carbon dioxide during the last deglaciation. *Proceedings of the National Academy of Sciences*, 113, 3465–3470.

Petrenko, V. J. Severinghaus, H. Schaefer, A. Smith, T. Kuhl, D. Baggenstos, Q. Hua, E. Brook, P. Rose, R. Kulin, **T. Bauska**, C. Harth, C. Buizert, A. Orsi, G. Emanuele, **J. Lee**, G. Brailsford, R. Keeling, R. Weiss, 2016, Measurements of  $^{14}\text{C}$  in ancient ice from Taylor Glacier, Antarctica constrain in situ cosmogenic  $^{14}\text{CH}_4$  and  $^{14}\text{CO}$  production rates, *Geochimica et Cosmochimica Acta*, 177, 62–77.

**Rhodes, R.** X. Faïn, E. J. Brook, J. R. McConnell, O. J. Maselli, M. Sigl, **J. Edwards, C. Buizert**, T. Blunier, J. Chappellaz, and J. Freitag, 2016, Local artifacts in ice core methane records caused by layered bubble trapping and in situ production: a multi-site investigation, *Clim. Past*, 12, 1061–1077, 2016.

**Shakun, J. P.** Clark E. Brook, N. Lifton, M. Caffee, and W. Shakun, 2015, Cosmogenic dating of Late-Pleistocene glaciation, southern tropical Andes, Peru, *Journal of Quaternary Science*. 30(8), 841-847.

Higgins, J. A., A. V. Kurbatov, N. E. Spaulding, E. Brook, D. S. Introne, L. M. Chimiak, Y. Yan, P. A. Mayewski and M. L. Bender, 2015, Atmospheric composition 1 million years ago from blue ice in the Allan Hills, Antarctica, *Proceedings of the National Academy of Sciences*: 112, 6887-6991.

**Rhodes, R. H.**, E. J. Brook, J. C. Chiang, T. Blunier, O. J. Maselli, J. R. McConnell, D. Romanini and J. P. Severinghaus, 2015, Enhanced tropical methane production in response to iceberg discharge in the North Atlantic, *Science* 348(6238): 1016-1019.

**WAIS Divide Community Members (OSU post doc Christo Buizert first author, includes E. Brook)**, 2015, Precise inter-polar phasing of abrupt climate change during the last ice age, *Nature* 520(7549): 661-665.

**Buizert, C.**, K. Cuffey, J. Severinghaus, D. Baggenstos, T. Fudge, E. Steig, B. Markle, M. Winstrup, **R. Rhodes** and E. Brook, 2015, The WAIS Divide deep ice core WD2014 chronology—Part 1: Methane synchronization (68–31 ka BP) and the gas age–ice age difference, *Climate of the Past* 11(2): 153-173.

**Bauska, T. K.**, F. Joos, A. C. Mix, R. Roth, J. Ahn and E. J. Brook, 2015, Links between

## CURRICULUM VITAE

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atmospheric carbon dioxide, the land carbon reservoir and climate over the past millennium, *Nature Geoscience*, **8**, 383-387.

**Marcott, S., Bauska, T., Buizert, C.**, Steig, E., **Rosen, J.**, Cuffey, K., Fudge, T.J., Severinghaus, J., Ahn, J., Kalk, M., McConnell, J., Sowers, T., Taylor, K., White, J. and Brook, E., 2014, Centennial-scale changes in the global carbon cycle during the last deglaciation, *Nature*, *514*, 616-619.

**Bauska, T.K.**, E. J. Brook, A. C. Mix, and A. Ross, 2014, High precision dual-inlet IRMS measurements of the stable isotopes of CO<sub>2</sub> and the N<sub>2</sub>O/CO<sub>2</sub> ratio from polar ice core samples, *Atmos. Meas. Tech. Discuss.* **7**, 6529-6564, 2014.

**Schilt, A.**, E. J. Brook, **T. K. Bauska**, D. Baggenstos\*, H. Fischer, F. Joos, V. V. Petrenko, H. Schaefer, J. Schmitt and J. P. Severinghaus, 2014, Isotopic constraints on marine and terrestrial N<sub>2</sub>O emissions during the last deglaciation, *Nature* *516*(7530): 234-237.

**Buizert, C.**, V. Gkinis, J.P. Severinghaus, F. He, B. S. Lecavalier, P. Kindler, M. Leuenberger, A. Carlson, B. Vinther, V. Masson-Delmotte, J.W.C. White, Z. Liu, B. Otto-Bliesner and E.J. Brook, 2014, Greenland temperature response to climate forcing during the last deglaciation, *Science*, *45*, 1093-1208.

**Buizert, C.**, D. Baggenstos, W. Jiang, R. Purtschert, V. V. Petrenko, Z.-T. Lu, P. Müller, T. Kuhl, J. Lee and J. P. Severinghaus, 2014, Radiometric <sup>81</sup>Kr dating identifies 120,000-year-old ice at Taylor Glacier, Antarctica, *Proceedings of the National Academy of Sciences* *111*(19): 6876-6881.

Carlson, A. E., K. Winsor, D. J. Ullman, E. J. Brook, D. H. Rood, Y. Axford, A. N. LeGrande, F. S. Anslow and G. Sinclair, 2014, Earliest Holocene south Greenland ice sheet retreat within its late Holocene extent, *Geophysical Research Letters* *41*(15): 5514-5521.

**Seierstad, I. K.**,\* P. M. Abbott, M. Bigler, T. Blunier, A. J. Bourne, E. Brook, S. L. Buchardt, C. Buizert, H. B. Clausen and E. Cook, 2014, Consistently dated records from the Greenland GRIP, GISP2 and NGRIP ice cores for the past 104 ka reveal regional millennial-scale δ<sup>18</sup>O gradients with possible Heinrich event imprint, *Quaternary Science Reviews* *106*: 29-46.

Ahn, J. and E.J. Brook, 2014, Siple Dome ice reveals two modes of millennial CO<sub>2</sub> change during the last ice age, *Nature Communications*, **5**, 3723, doi:10.1038/ncomms4723.

Ahn, J., E.J. Brook, and **C. Buizert**, 2014, Response of atmospheric CO<sub>2</sub> to the abrupt cooling event 8200 years ago, *Geophysical Research Letters*. *41*, 604–609.

Fudge, T.J\*., Eric J. Steig, Bradley R. Markle\*, Kendrick C. Taylor, Joseph R. McConnell, Edward J. Brook, Todd Sowers, James W. C. White, Spruce W. Schoenemann\* , Richard B. Alley, Hai Cheng, Gary D. Clow, Jihong Cole-Dai, Howard Conway, Kurt M. Cuffey, **Jon S. Edwards**, R. Lawrence Edwards, Ross Edwards, John M. Fegyveresi, David Ferris, Joan J. Fitzpatrick, Jay Johnson, Geoffrey Hargreaves, James E. Lee, Olivia J. Maselli, William Mason, Kenneth C. McGwire, **Logan E. Mitchell**, Nicolai Mortensen, Peter Neff, Anais J. Orsi, Andrew J. Schauer, Jeffrey P. Severinghaus,

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Michael Sigl, Matthew K. Spencer, Bruce H. Vaughn, Donald E. Voigt, Edwin Waddington, Xianfeng Wang, Gifford J. Wong, 2013, Deglacial warming in West Antarctica driven by both local orbital and Northern Hemisphere forcing, *Nature*, 500(7463), 440-444.

**Rosen, J.**, E. Brook, J. Severinghaus, T. Blunier, **L. Mitchell**, **J. Lee**, **J. Edwards**, and V. Gkinis, 2014, An ice core record of near-synchronous global climate changes at the Bolling transition, *Nature Geoscience*, 6, 459-463.

Fischer, H. Jeff Severinghaus, Ed Brook, Eric Wolff, Mary Albert, Olivier Alemany, Rob Arthern, Charles Bentley, Donald Blankenship, Jerome Chappellaz, Timothy Creyts, Dorthe Dahl-Jensen, Michael Dinn, Massimo Frezzotti, Shuji Fujita, Hubert Gallee, Richard Hindmarsh, Don Hudspeth, Gerard Jugie, Kenji Kawamura, Vladimir Lipenkov, Heinz Miller, Hideaki Motoyama, Rob Mulvaney, Frank Pattyn, Catherine Ritz, Ted Scambos, Jakob Schwander, Daniel Steinhage, Tas van Ommen, Frank Wilhelms, 2013, Where to find 1.5 million yr old ice for the IPICS" Oldest-Ice" ice core, *Climate of the Past*, 9(6).

Chappellaz, J., C. Stowasser\*, T. Blunier, D. Baslev-Clausen, E.J. Brook, R. Dallmayr, X. Fain, J.E. Lee, **L.E. Mitchell**, O. Pascual, D. Romanini, **J. Rosen**, and S. Schupbach\*, 2013, High-resolution glacial and deglacial record of atmospheric methane by continuous-flow and laser spectrometer analysis along the NEEM ice core, *Climate of the Past*, 9, 2579-2953.

**Mitchell, L.**, Ed Brook, **James E. Lee**, **Christo Buizert**, and Todd Sowers, 2013, Constraints on the Late Holocene Anthropogenic Contribution to the Atmospheric Methane Budget, *Science*, 342 (6161), 964-966.

Rasmussen, Sune, O., Peter Abbott, Thomas Blunier, Anna Bourne, Ed Brook, Susanne Lilja Buchardt, **Christo Buizert**, Jérôme Chappellaz, Henrik B. Clausen, Eliza Cook, Dorthe Dahl-Jensen, Siwan Davies, Myriam Guillevic, Sepp Kipfstuhl, Thomas Laepple, Inger K. Seierstad, Jeffrey P. Severinghaus, J.P. Steffensen, Christopher Stowasser, Anders Svensson, Paul Vallelonga, Bo M. Vinther, Frank Wilhelms, Mai Winstrup, 2013, A first chronology for the NEEM ice core, *Climate of the Past*, 9, 2713–2730.

Faïn, X. J Chappellaz, **RH Rhodes**, **C Stowasser\***, T Blunier, JR McConnell, EJ Brook, S Preunkert, M Legrand, T Desbois, D Romanini, 2013, High resolution measurements of carbon monoxide along a late Holocene Greenland ice core: evidence for in-situ production, *Climate of the Past Discussions*, 9(3), 2817-2857.

Brook, E.J., 2013, Leads and lags at the end of the last ice age, *Science*, 339 (6123), 1042-1043.

Landvik, J., E. Brook, L. Gualtieri, H. Linge, G. Raisbeck, and O. Salvigsen, 2013, <sup>10</sup>Be exposure age constraints on the Late Weichselian ice sheet geometry and dynamics in inter ice-stream areas, western Svalbard, *Boreas*, 42, 43-56

**Rhodes, R.**, X. Fain, C. Stowasser, T. Blunier, J. Chappellaz, J. McConnell, **L. Mitchell**, and E. Brook, 2013, Continuous ice core methane measurements from a late Holocene

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## CURRICULUM VITAE

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- Greenland ice core: atmospheric and in-situ signals, *Earth and Planetary Science Letters*, 368, 9–19
- NEEM Project Members (includes Ed Brook, **Julia Rosen**, **Christo Buizert** and **Adrian Schilt** from OSU), 2013 Eemian interglacial reconstructed from Greenland folded NEEM ice core strata, *Nature* 493, 489-494.
- Ahn, J.**, Brook, E. J., Schmittner, A., & Kreutz, K., 2012, Abrupt change in atmospheric CO<sub>2</sub> during the last ice age, *Geophysical Research Letters* 39(18), L18711.
- Ahn, J.**, E. Brook, L. Mitchell, **J. Rosen**, J. McConnell, K. Taylor, D. Etheridge, and M. Rubino, 2012, Atmospheric CO<sub>2</sub> over the last 1000 years: A high-resolution record from the West Antarctic Ice Sheet (WAIS) Divide ice core. *Global Biogeochemical Cycles* 26, GB2027.
- Clark, P.U., **Shakun, J.D.\***, Baker, P.A., Bartlein, P.J., Brewer, S., Brook, E.J., Carlson, A.E., Cheng, H., Kaufman, D.S., Liu, Z., Marchitto, T.M., Mix, A.C., Morrill, C., Otto-Bliesner, B., Pahnke, K., Russell, J.M., Whitlock, C., Adkins, J.F., Blois, J.L., Clark, J., Colman, S.C., Curry, W.B., Flower, B.P., He, F., Johnson, T.C., Lynch-Stieglitz, J., Markgraf, V., McManus, J.F., Mitrovica, J.X., Moreno, P.I., Williams, J.W., 2012, Global climate evolution during the last deglaciation. *Proceedings of the National Academy of Sciences*, 109(19), E1134-E1142.
- Buizert, C.**, Petrenko, V. V., Kavanaugh, J. L., Cuffey, K. M., Lifton, N. A., Brook, E. J., & Severinghaus, J. P., 2012, In situ cosmogenic radiocarbon production and 2-D ice flow line modeling for an Antarctic blue ice area. *Journal of Geophysical Research*, 117(F2), F02029.
- Brook, E., in press, Correlations Between Greenland and Antarctic Ice Core Records, in Elias, S. (ed.), *Encyclopedia of Quaternary Science 2<sup>nd</sup> ed.*, Elsevier.
- Brook, E., in press, Overview of ice core research, in Elias, S. (ed.), *Encyclopedia of Quaternary Science 2<sup>nd</sup> ed.*, Elsevier.
- Brook, E. and J. Severinghaus, 2011, Comment on “Methane emissions from extinct Megafauna, by F. Smith, S. Elliott, and S. Lyons, *Nature Geoscience* 4, 271–272 doi:10.1038/ngeo1140.
- Mitchell, L.**, E. Brook, T. Sowers, J. McConnell, and K. Taylor, 2011, Multidecadal variability of atmospheric methane, 1000-1800 C.E, *Journal of Geophysical Research* 116, G02007, doi:10.1029/2010JG001441.
- Severinghaus, J., E. W. Wolff, and E. J. Brook, 2010, Searching for the Oldest Ice, *EOS Transactions* 91, 357-358.
- Brook, E., M. Kurz, and J. Curtice, 2009, Flux and size fractionation of <sup>3</sup>He in interplanetary dust from Antarctic ice core samples, *Earth and Planetary Science Letters* 286, 565-569.
- Brook, E., 2009, Atmospheric carbon footprints, *Nature Geoscience* 2, 170-172.
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- Liu, B. L. Otto-Bliesner, F. He, E. C. Brady, R. Tomas, P. U. Clark, A. E. Carlson, J. Lynch-Stieglitz, W. Curry, E. Brook, D. Erickson, R. Jacob, J. Kutzbach, and J. Cheng, 2009, Transient Simulation of Last Deglaciation with a New Mechanism for Bølling-Allerød Warming, *Science* 325, 310-314, doi:10.1126/science.1171041.
- Severinghaus, J., R. Beaudette, **M. Headly\***, K. Taylor, and E. Brook, 2009, Oxygen-18 of O<sub>2</sub> records the impact of abrupt change on the terrestrial biosphere, *Science* 324, 5933, 1431-1434, doi:10.1126/science.1169473.
- Petrenko, V\***, V., A. M. Smith, E. J. Brook, D. Lowe, K. Riedel, G. Brailsford, Q. Hua, H. Schaefer, N. Reeh, R. F. Weiss, D. Etheridge and J. P. Severinghaus, 2009, <sup>14</sup>CH<sub>4</sub> measurements in Greenland ice: investigating last glacial termination CH<sub>4</sub> sources, *Science* 324, 506-508.
- Grachev, A.**, E. Brook, J. Severinghaus, and N. Pias, 2009, Relative timing and variability of atmospheric methane and GISP2 oxygen isotopes between 68 and 86 ka, *Global Biogeochemical Cycles* 23, GB2009, doi:10.1029/2008GB003330.
- Schaefer, H., V. Petrenko\***, E. Brook, J. Severinghaus, N. Reeh, J. Melton, and L. Mitchell, 2009, Ice stratigraphy at the Pakitsoq ice margin, West Greenland, derived from gas records, *Journal of Glaciology* 55, 191, 411-421.
- Ahn, J.** and E. Brook, 2008, Atmospheric CO<sub>2</sub> and Climate on Millennial Time Scales During the Last Glacial Period, *Science* 322, doi:10.1126/science.1160832.
- Brook, E., 2008, Windows on the greenhouse, *Nature* 453, 291-292.
- Ahn, J., Headly, M\***, Wahlen, M., Brook, E.J., Mayewski, P.A., and Taylor, K.C., 2008, CO<sub>2</sub> diffusion in polar ice: observations from naturally formed CO<sub>2</sub> spikes in the Siple Dome (Antarctica) ice core, *Journal of Glaciology* 54, 685-695.
- Petrenko, V\***, J. P. Severinghaus, E.J. Brook, J. Mühle, M. Headly, C. M. Harth, H. Schaefer, N. Reeh, R. F. Weiss, D. Lowe and A. M. Smith, 2008, A novel method for obtaining very large ancient air samples for analyses of methane radiocarbon, *Journal of Glaciology* 54, 185, 233-244.
- Petrenko, V.\***, A. M. Smith, G. Brailsford, K. Riedel, Q. Hua, D. Lowe, J. P. Severinghaus, V. Levchenko, T. Bromle, R. Moss, J. Mühle and E. J. Brook, 2008, A new method for analyzing <sup>14</sup>C of methane in ancient air extracted from glacial ice, *Radiocarbon*, 50, 53-73.
- Goehring, B.M.**, Brook, E.J., **Linge, H.C.**, and Raisbeck, G.M., 2008. Beryllium-10 Exposure ages of erratic boulders in southern Norway and implications for the history of the Fennoscandian Ice Sheet. *Quaternary Science Reviews* 27, 320-336.
- Rinterknecht, V. R.\***, I.E. Pavlovskaya, P.U. Clark, G.M. Raisbeck, G. M., F. Yiou, and E.J. Brook, 2007, Timing of the last deglaciation in Belarus. *Boreas* 36, 307-313.
- Grachev, A.**, E. Brook and J. Severinghaus, 2007, Abrupt changes in atmospheric methane



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at the MIS 5b-5a transition, *Geophysical Research Letters* 34, L20703, doi:10.1029/2007GL029799.

**Carlson, A.\***, P. U. Clark, G. Raisbeck and E. Brook, 2007, Rapid Holocene deglaciation of the Labrador Sector of the Laurentide Ice Sheet, *Journal of Climate* 20, 5126-5133.

Schmittner, A., E. Brook and **J. Ahn**, 2007, Impact of the ocean's overturning circulation on atmospheric CO<sub>2</sub>, in Schmittner et al. (eds.), *Ocean Circulation: Mechanisms and Impacts, Geophysical Monograph Series 173*, American Geophysical Union, Washington D.C.

**Linge, H.**, L. Olsen, E. Brook, **J. Darter\***, D. Mickelson, G. Raisbeck and F. Yiou, 2007, Cosmogenic exposure ages from Nordland, northern Norway: implications for deglaciation in a coast to inland transect, *Norwegian Journal of Geology* 87, 269-280.

**Carlson, A.\***, P.U. Clark, B.A. Haley, G.P. Klinkhammer, K. Simmons, E. Brook, and K. Meissner, 2007, Geochemical proxies of North American freshwater routing during the Younger Dryas, *Proceedings of the National Academy of Sciences* 104, 6556-6561.

**Ahn, J.** and E. Brook, 2007, Atmospheric CO<sub>2</sub> and climate from 65 to 30 ka B.P., *Geophysical Research Letters* 34, L10703, doi:10.1029/2007GL029551.

**Kobashi, T.\***, J. Severinghaus, E. Brook, J.M. Barnola and A. Grachev, 2007, Precise timing and characterization of abrupt climate change at 8.2k B.P. from air trapped in polar ice *Quaternary Science Reviews* 26, 1212-1222.

**Harder, S.**, D.T. Schindell, G.A. Schmidt and E. Brook, 2007, A GCM study of CH<sub>4</sub> emissions during the Holocene and glacial-interglacial transitions constrained by ice core data, *Global Biogeochemical Cycles* 21, GB1011, doi:10.1029/2005GB002680, 2007.

Nesje, A., S.O. Dahl, C. Ballantyne, **H. Linge**, D. McCarroll, E.J. Brook, G. Rasibeck, and F. Yiou, 2007, The surface geometry of the Last Glacial Maximum ice sheet in the Andøya Skaånland region, northern Norway, constrained by surface exposure dating and clay mineralogy, *Boreas* 36, 1-13.

**Rinterknecht, V.R.\***, P. U. Clark, G. M. Raisbeck, F. Yiou, A. Bitinas, E. J. Brook, L. Marks, V. Zelc's, J.-P. Lunkka, I. E. Pavlovskaya, J. A. Piotrowski and A. Raukas, 2006, The Last Deglaciation of the Southeastern Sector of the Scandinavian Ice Sheet, *Science* 311, 1449-1452.

**Fjellanger, J.\***, L. Sørbel, **H. Linge**, E. Brook, G. M. Raisbeck and F. Yiou, 2006, Glacial survival of blockfields on the Varanger Peninsula, northern Norway, *Geomorphology* 82, 255-272.

**Linge, H.**, E. Larsen, K. Kjaer, I. Demidov, E. Brook, G. Raisbeck and F. Yiou, 2006, Cosmogenic <sup>10</sup>Be exposure age dating across Early to Late Weichselian ice-marginal zones in northwestern Russia, *Boreas* 35, 10.1080/03009480600781909.

## CURRICULUM VITAE

---

- Petrenko, V\***, J. Severinghaus, E. Brook, N. Reeh and **H. Schaefer**, 2006, Gas records from the west Greenland ice margin covering the last glacial termination: a horizontal ice core, *Quaternary Science Reviews* 25, 865–875.
- Suwa, M.\***, J. von Fischer, M. Bender, A. Landais and E. Brook, 2006, Chronology reconstruction for the disturbed bottom section of the GISP2 and the GRIP ice cores: Implications for Termination II in Greenland, *Journal of Geophysical Research* 111, D02101, doi:10.1029/2005JD006032.
- Brook, E., 2006, Using stable isotopes for climate reconstruction in ice cores, in Elias, S. (ed.), *Encyclopedia of Quaternary Science*, Elsevier.
- Brook, E., 2006, Correlations Between Greenland and Antarctic Ice Core Records, in Elias, S. (ed.), *Encyclopedia of Quaternary Science*, Elsevier.
- Brook, E., 2006, Overview of ice core research, in Elias, S. (ed.), *Encyclopedia of Quaternary Science*, Elsevier.
- Schaefer, H.**, M. Whiticar, E. Brook, V. Petrenko, D. Ferretti and J. Severinghaus, 2006, Ice record of  $\delta^{13}\text{C}$  for atmospheric methane across the Younger Dryas-Pre Boreal Transition, *Science* 313, 1109-1112.
- Linge, H.**, E. Brook, A. Nesje, G. Raisbeck, F. Yiou, and H. Clark 2007, In situ  $^{10}\text{Be}$  exposure ages from southeastern Norway: implications for the geometry of the Weichselian Scandinavian ice sheet, *Quaternary Science Reviews* 25, 1097-1109.
- Brook, E., 2005, Tiny Bubbles Tell All, *Science* 310, 1285-1287.
- Rinterknecht V.R.\***, L. Marks J.A. Piotrowski, G.M. Raisbeck G.M., F. Yiou F., E.J. Brook, and P.U. Clark, 2005, Cosmogenic  $^{10}\text{Be}$  ages on the Pomeranian Moraine, Poland, *Boreas* 34, 186-191.
- Brook, E., J.W.C. White, **A. Schilla\***, M. Bender, B.A. Barnett, J. Severinghaus, K.C. Taylor, R.B. Alley and E.J. Steig, 2005, Timing of millennial-scale climate change at Siple Dome, West Antarctica, during the last glacial period, *Quaternary Science Reviews* 24, 1333-1343.
- Waddington, E., H. Conway, E. Steig, R. Alley, E. Brook, E. and J. White, 2005, Decoding the dipstick, thickness of Siple Dome, West Antarctica, at the last glacial maximum, *Geology* 33, 281-284.
- Rinterknecht, V.R.\***, P.U. Clark, G.M. Raisbeck, F. Yiou, E.J. Brook, S. Tschudi and J.P. Lunkka, 2004, Cosmogenic  $^{10}\text{Be}$  dating of the Salpausselkä I moraine in southwestern Finland, *Quaternary Science Reviews* 23, 2283-2289.
- Taylor, K.C., R.B. Alley, D.A. Meese, **M.K. Spencer\***, E.J. Brook, N.W. Dunbar, R. Finkel, A.J. Gow, A.V. Kurbatov, G.W. Lamorey, P.A. Mayewski, E. Meyerson, K. Nishiizumi

## CURRICULUM VITAE

---

- and G.A. Zielinski, 2004, Dating the Siple Dome, Antarctica ice core by manual and computer interpretation of annual layering, *Journal of Glaciology* 50, 453-461.
- Taylor, K. C., J.W.C. White, J.P. Severinghaus, E.J. Brook, P.A. Mayewski, R.B. Alley, E. J. Steig, **M.K. Spencer\***, **E. Meyerson\***, D.A. Meese, G.W. Lamorey, A. Grachev, A.J. Gow and B.A. Barnett, 2004, Abrupt climate change around 22 ka on the Siple Coast of Antarctica, *Quaternary Science Reviews* 23, 7-14.
- Ahn, J.**, M. Wahlen, B. Deck, E.J. Brook, P. A. Mayewski, K.C. Taylor and J.W.C. White, 2004, A record of atmospheric CO<sub>2</sub> during the last 40,000 years from the Siple Dome, Antarctica ice core, *Journal of Geophysical Research* 109, D13305, doi:10.1029/2003JD004415.
- Delmotte, M\***, J. Chappellaz, E. Brook, P. Yiou, J.M. Barnola, C. Goujon, D. Raynaud and V. I. Lipenkov, 2004, Atmospheric methane during the last four glacial-interglacial cycles: rapid changes and their link with Antarctic temperature, *Journal of Geophysical Research* 109, D12104, doi:10.1029/2003JD004417.
- Licciardi, J.\***, P. Clark, E. Brook, D. Elmore and P. Sharma, 2004, Variable responses of western U.S. glaciers during the last deglaciation, *Geology* 32, 81-84.
- Landvik, J., E.J. Brook, L.J. Gualtieri, G. Raisbeck, O. Salvigsen and F. Yiou, 2003, Northwest Svalbard during the last glaciation: ice free areas existed, *Geology* 31, 905-908.
- Clark, P.U., E.J. Brook, G. Raisbeck, F. Yiou and J. Clark, 2003, Cosmogenic <sup>10</sup>Be ages of the Saglek Moraines, Torngat Mountains, Labrador, *Geology* 31, 617-620.
- Alley, R.B., E.J. Brook and S. Anandakrishnan, 2002, A northern lead in the orbital band: north-south phasing of events, *Quaternary Science Reviews* 21, 431-441.
- Licciardi, J.\***, P.U. Clark, E.J. Brook, K.L. Pierce, M.D. Kurz, D. Elmore and P. Sharma, 2001, Cosmogenic <sup>3</sup>He and <sup>10</sup>Be chronologies of the late Pinedale northern Yellowstone Ice Cap, Montana, USA, *Geology* 29, 1095-1098.
- Cuffey, K. and E.J. Brook, 2001, Chapter 18: Ice core paleoclimate records. In Jacobsen et al. (eds.) *Earth System Science*. Academic Press.
- Blunier, T\*** and E.J. Brook, 2001, Timing of millennial-scale climate change in Antarctica and Greenland during the last glacial period, *Science* 291, 109-112.
- Brook, E.J., M.D. Kurz, J. Curtice and S. Cowburn, 2000, Accretion of interplanetary dust in polar ice, *Geophysical Research Letters* 27, 3145-3148.
- Brook, E.J., **S. Harder**, J. Severinghaus, E. Steig and C. **Sucher**, 2000, On the origin and timing of rapid changes in atmospheric methane during the last glacial period, *Global Biogeochemical Cycles* 14, 559-572.

## CURRICULUM VITAE

---

- Brook, E.J., J. Severinghaus, **S. Harder**, and M. Bender, 1999, Atmospheric methane and millennial-scale climate change, In Clark, P., L. Keigwin, and R. Webb, (eds.) AGU Monograph on Mechanisms of Millennial Scale Climate Change, Geophysical Monograph 112, AGU, Washington 165-176.
- Severinghaus, J. and E. Brook, 1999, Simultaneous tropical-abrupt climate change at the end of the last glacial period inferred from trapped air in polar ice, *Science* 286, 930-934.
- Licciardi, J.\***, P. Clark, M. Kurz and E. Brook, 1999, Calibration of cosmogenic  $^3\text{He}$  production rates: Results from Holocene lava flows in Oregon, USA, *Earth and Planetary Science Letters* 172, 261-271.
- Severinghaus, J.P., T. Sowers, E. Brook, R.B. Alley and M.L. Bender, 1998, Timing of abrupt climate change at the end of the Younger Dryas interval from thermally fractionated gases in polar ice, *Nature* 391, 141-148.
- Steig., E.J., E.J. Brook, J.W.C. White, **C.M. Sucher\***, M.L. Bender, S.J. Lehman, D.L. Morse, E.D. Waddington and G.D. Clow, 1998, Synchronous climate changes in Antarctic and the North Atlantic, *Science* 282, 92-95.
- Taylor, K., P. Mayewski, R. Alley, E. Brook, A. Gow, P. Grootes, A. Meese, E. Saltzman, J. Severinghaus, M. Twickler, J. White, S. Whitlow and G. Zielinski, 1997, The Holocene/Younger Dryas transition as recorded at Summit, Greenland, *Science* 278, 825-827.
- Chappellaz, J., E. Brook, T. Blunier and **B. Malaize\***, 1997,  $\text{CH}_4$  and  $\text{d}^{18}\text{O}$  of  $\text{O}_2$  records from Greenland and Antarctic ice: a clue for stratigraphic disturbance in the bottom part of the GRIP and GISP2 ice cores, *Journal of Geophysical Research* 102(C12), 26,547-26,557.
- Sowers, T., E. Brook, **T. Blunier\***, A. Fuchs, M. Leuenberger, J. Chappellaz, J.M. Barnola, D. Etheridge, M. Whalen, B. Deck and C. Weyhenmeyer, 1997, An interlaboratory comparison of techniques for extracting and analyzing trapped gases in ice cores, *Journal of Geophysical Research* 102(C12), 26,527-26,538.
- Brook, E.J. and T. Sowers, 1996, Rapid variations in atmospheric methane concentration during the past 110 ka, *Science* 273, 1,087-1,091.
- Brook, E.J., A. Nesje, S.J. Lehman, G. Raisbeck and F. Yiou, 1996, Cosmogenic nuclide exposure ages along a vertical transect in western Norway: implications for the thickness of the Fennoscandian Ice Sheet, *Geology* 24, 207-210.
- Brook, E.J., E.T. Brown, M.D. Kurz, G. Raisbeck and F. Yiou, 1996, An Antarctic perspective on cosmogenic nuclide production, *Radiocarbon* 38, 150.
- Brook, E.J., M.D. Kurz, R.P. Ackert, G. Raisbeck and F. Yiou, 1995, Exposure ages and glacial history of late Wisconsin Ross Sea Drift, Antarctica, *Earth and Planetary Science Letters* 131, 41-56.

## CURRICULUM VITAE

---

Brook, E.J., E.T. Brown, M.D. Kurz, R.P. Ackert, G. Raisbeck and F. Yiou, 1995, Constraints on erosion and uplift of glacial deposits in the Transantarctic Mountains determined with *in situ* cosmogenic  $^{10}\text{Be}$  and  $^{26}\text{Al}$ : implications for Antarctic glacial history, *Geology* 23, 1,063-1,066.

Kurz, M. D. and E. J. Brook, 1994, Surface Exposure Dating with Cosmogenic Nuclides, 1994. In C. Beck (ed.) *Dating in a Surface Context*. University of New Mexico Press, Albuquerque. p. 139-159.

Brook, E.J., M.D. Kurz, R.P. Ackert Jr., G.H. Denton, E.T. Brown, G.M. Raisbeck and F. Yiou, 1993, Chronology of Taylor Glacier Advances in Arena Valley, Antarctica, using *in situ* cosmogenic  $^3\text{He}$  and  $^{10}\text{Be}$ , *Quaternary Research* 39, 11-23.

Brook, E.J. and M.D. Kurz, 1993, Using *in situ* cosmogenic  $^3\text{He}$  in Antarctic quartz sandstone boulders for surface-exposure chronology, *Quaternary Research* 39, 1-10.

Brown, E. T., E. J. Brook, G. M. Raisbeck, F. Yiou and M. D. Kurz, 1992, Effective attenuation lengths of cosmic rays producing  $^{10}\text{Be}$  and  $^{26}\text{Al}$  in quartz: Implications for exposure dating, *Geophysical Research Letters* 19, 367-372.

Brown, E., J.M. Edmond, G.M. Raisbeck, F. Yiou, M. Kurz and E.J. Brook, 1991, Examination of surface exposure ages of Antarctic moraines using in-situ produced  $^{10}\text{Be}$  and  $^{26}\text{Al}$ , *Geochimica et Cosmochimica Acta* 55, 2269-2283.

Moore, J.N., E.J. Brook and C. Johns, 1989, Grain size partitioning of metals in contaminated coarse-grained river floodplain sediment: Clark Fork River, Montana, USA, *Environmental Geology and Water Sciences* 14, 107-115.

Brook, E.J. and J.N. Moore, 1988, Particle size and chemical control of As,Cd,Cu,Fe,Mn,Ni,Pb and Zn in bed sediment from the Clark Fork River, Montana (USA), *The Science of the Total Environment* 76, 247-266.

### **PEER REVIEWED REPORTS FOR GOVERNMENT OR OTHER AGENCIES**

Lead author for US Climate Change Science Program Synthesis and Assessment Product 3.4, Abrupt Climate Change, Chapter 5, Abrupt Changes in Atmospheric Methane. Coauthors: David Archer, Ed Dlugokencky, Steve Frolking, Dave Lawrence.

### **REPORTS AND PUBLICATIONS IN NON PEER REVIEWED JOURNALS AND BOOKS**

Blunier, T., J. Chappellaz, and E. Brook, Continuous in-field measurements of gas concentration from ice cores PAGES news 21, March 2013.

Brook, E. and E. Wolff, 2005, The future of ice core science, *EOS* 87, 39.

Ice Core Working Group, 2003, U.S Ice Core Science: Recommendations for the Future. (Report to NSF, available from National Ice Core Laboratory Science Management Office).

## CURRICULUM VITAE

---

Bender, M.L., T. Sowers, and E. Brook, 1997, Gases in ice cores, *Proceedings of the National Academy of Sciences* 94, 8,434-8,349.

Brook, E. J., M. D. Kurz and R. P. Ackert, 1993, Chronology of Taylor Glacier advances in Arena Valley using *in situ* produced cosmogenic 3-He, *Antarctic Journal of the United States* XXVI(5).

Kurz, M.D., E. J. Brook and R. P. Ackert, 1993, High altitude volcanic outcrops in the Kukri Hills, Southern Victoria Land, *Antarctic Journal of the United States*. XXVI(5), 30-32.

Kurz, M.D., E. J. Brook and R. P. Ackert, 1993, Surface exposure dating of Antarctic glacial deposits, *Antarctic Journal of the United States*. XXVI(5), 85-86.

### RESEARCH GRANTS

A high-resolution atmospheric methane record from the South Pole Ice Core, NSF Antarctic Glaciology, 1/17 to 12/19. \$184,956.

Collaborative research: Kr-86 as a proxy for barometric pressure variability and movement of the SH westerlies during the last deglaciation, NSF Antarctic Glaciology, 4/2016 to 3/19, \$159,999

Collaborative Research: Inert gas and methane based climate records throughout the South Pole deep ice core, NSF Arctic Natural Sciences, 1/15 to 12/17. Co-PI with Jeff Severinghaus, Scripps Institution of Oceanography and Todd Sowers, Penn State University, Brook budget \$166,785.

Collaborative Research: Window into the World with 40,000-year Glacial Cycles from Climate Records in Million Year-old Ice from the Allan Hills Blue Ice Area, NSF Antarctic Glaciology, 8/15 to 7/18, \$104,379.

Carbon dioxide and nitrous oxide dynamics during the Holocene Epoch, NSF Arctic Natural Sciences, 4/15 to 3/18. Brook budget \$432,111.

Collaborative Research: POISE (Petermann Ocean Ice Shelf Experiment)-Paleo Context for Ocean Ice Interactions, NSF Arctic System Science, 8/13 to 7/17. Brook budget \$358,802.

Completing the WAIS Divide CO<sub>2</sub> record, NSF Polar Programs, 1/2013 to 12/2016, \$479,981.

Collaborative Research: The Taylor Glacier, Antarctica, horizontal ice core: exploring changes in the natural methane budget in a warming world and expanding the paleo-archive, NSF Polar Programs, 7/2013 to 6/2017 \$394,742.

Collaborative Research: Investigating the potential of carbon-14 in polar firn and ice as a tracer of past cosmic ray flux and an absolute dating tool, NSF Polar Programs, 7/12 to 6/16, \$184,061. Co PI with Vas Petrenko, University of Rochester and Jeff Severinghaus, UC San Diego.

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Collaborative Research: Continuous records of greenhouse gases and aerosol deposition over the Holocene epoch: testing the fidelity of new methods for reconstructing atmospheric change, NSF Polar Programs, 10/12 to 9/15, \$263,141. Co PI with Joe McConnell Desert Research Institute.

Collaborative Research: Investigating Upper Pleistocene Rapid Climate Change using Continuous, Ultra-High-Resolution Aerosol and Gas Measurements in the WAIS Divide Ice Core, NSF Polar Programs, 9/2012 to 8/2015, \$80,027. Co-PI with Joe McConnell, Desert Research Institute.

Collaborative Research: Applications of advanced laser spectroscopy to the ice core record of changes in climate and methane biogeochemistry, NSF Polar Programs, 1/10 to 12/13, \$670,020.

Collaborative Research: Ice core studies reconstructing Greenland climate during the Eemian and beyond, NSF Polar Programs, 7/11 to 6/14, \$85,397 to OSU. Co-PI with Michael Bender, Princeton University.

Collaborative Research: Replicate Coring at WAIS Divide to Obtain Additional Samples at Events of High Scientific Interest, NSF Polar Programs, 7/11 to 6/15, \$327,079 to OSU. Co-PI with Jeff Severinghaus, UC San Diego.

Collaborative Research: Completing an ultra-high resolution methane record from the WAIS Divide ice core, NSF Polar Programs, 1/11 to 12/13, \$351,834 to OSU. Co-PI with Todd Sowers, Penn State University.

PIRE: ICE-ICS: International Collaboration and Education in Ice Core Science, NSF Partnerships in International Research and Education, 9/1/10 to 8/31/15, \$4,500,000.

Collaborative Research: Deglaciation of the Ross Sea Embayment, constraints from Roosevelt Island, NSF Office of Polar Programs, 9/1/10 to 8/31/13, \$200,729. Co PI with Ed Waddington and Howard Conway, University of Washington.

Toward a Glacial-Interglacial Record of  $\delta^{13}\text{C}$  of Atmospheric  $\text{CO}_2$  from the WAIS Divide Ice Core. Gary Comer Foundation, 6/15/08 to 6/14/10, \$50,678.

Developing a record of the stable carbon isotopic composition of atmospheric  $\text{CO}_2$  from the LGM to the Holocene, NSF Office of Polar Programs, 1/1/09-12/31/12, \$411,238 (A Mix at OSU is a co-PI).

Collaborative Research: A "horizontal ice core" for large-volume samples of the past atmosphere, Taylor Glacier, Antarctica, NSF Office of Polar Programs, 7/1/09 to 6/30/12, \$294,755 Co-PI with Jeff Severinghaus, UC San Diego.

IPY: Collaborative Research: The NEEM Deep Ice Core. NSF OPP, 5/08-4/13, \$517,034 to OSU (collaborative effort with University of Colorado, Scripps Institution of Oceanography, Penn State University).

## CURRICULUM VITAE

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Atmospheric carbon dioxide and climate change: the WAIS Divide record, NSF Office of Polar Programs, 1/08-12/10, \$708,340.

Developing a Rapid Method for Measuring Greenhouse Gases (CO<sub>2</sub>, CH<sub>4</sub>, N<sub>2</sub>O) in Ice Cores, OSU College of Science Ventures Fund, \$10,370. Co-PI with Alexi Grachev, OSU.

Collaborative Research: Project PALEOVAR -- Past Climate Variability: Understanding Mechanisms and Interactions with the Mean State, NSF-ATM, 6/06-5/11, \$228,693 to Brook. Co-PI with P. Clark, A. Mix, A. Schmittner, N. Pias, S. Hostetler at OSU, P. Bartlein, U of O, and Larry Edwards, Univ. of Minn. Total award to OSU=\$3,100,000.

Ice core trace gas records and abrupt climate change, Gary Comer Science and Education Foundation, 3/06-2/08, \$220,000.

Collaborative Research: Constructing an ultra-high resolution atmospheric methane record for the last 140,000 years from the WAIS Divide Ice Core, NSF Office of Polar Programs, 9/06 to 8/10, \$274,466. Co PI with Todd Sowers, Penn State.

Acquisition of a Noble Gas Mass Spectrometer at Oregon State University, MRI from NSF OCE, 9/06-8/08, \$611,930. Co-PI with D. Graham, J. Lupton, and R. Duncan, OSU.

REU Supplement: High Resolution Records of Atmospheric Methane in Ice Cores and Implications for Late Quaternary Climate Change, \$4,035, 4/10/05 to 4/09/06.

Collaborative Research: New insights into the Holocene methane budget from dual isotope systematics and the inter-polar gradient, NSF Office of Polar Programs, 8/15/05-8/15/08. \$149,085 to OSU, \$382,391 total. Co-PI with Todd Sowers, Penn State.

Collaborative research: Gases in firn air and shallow ice at the proposed WAIS drilling site, NSF Office of Polar Programs, 6/1/05-5/31/07. \$176,706 to WSU, ~\$1M total (Collaboration with Todd Sowers, Penn State, Eric Saltzman, UCI, Jeff Severinghaus, UCSD, Mark Battle, Bowdoin College, and Jim White, CU).

Constraining natural changes in the methane budget through stable isotope analysis, Petroleum Research Fund of the American Chemical Society, \$80,000, 4/1/05-8/31/07.

Improving ice core records of greenhouse gas variations, Gary Comer Foundation, 8/04-7/07, \$330,000.

Developing dry extraction of ice core gases and application to millennial-scale CO<sub>2</sub> variability, NSF Office of Polar Programs, 6/04-5/07, \$444,125.

Collaborative Research: Determining methane sources during the last deglaciation with large-volume air samples from Pakitsiq, West Greenland, NSF Office of Polar Programs, 1/02-12/05, \$175,474 to WSU, \$445,000 total. Co PI with J. Severinghaus, Scripps Institute of Oceanography.



## CURRICULUM VITAE

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Global Climate Change: A Workshop for 6-12 Teachers (with S. Harder, WSU), Eisenhower Professional Development Program, 12/1/02-8/31/02, \$30,365.

Measurement of Carbon Dioxide in Ice Cores (with Kirk Soule, Sunset High School, Portland, OR), Murdoch Charitable Trust Partners in Science Program, 6/02-6/04, \$14,000.

High-resolution records of atmospheric methane in ice cores and implications for late Quaternary climate change, NSF, Office of Polar Programs, Antarctic Glaciology Program, 1/02-12/05, \$304,701.

Ice core records of atmospheric carbon monoxide, NSF, Office of Polar Programs, Antarctic Glaciology Program, 1/02-12/02, \$98,128.

Collaborative research: Development of an in situ fossil air melt extraction device (proto-INFAMED) for recovering large volumes of air and microparticles from polar ice sheets, NSF, Office of Polar Programs, Polar Instrumentation and Technology Development Program, 1/01-12/02, \$66,059 to WSU, \$137,300 total. Co PI with J. Severinghaus, Scripps Institute of Oceanography.

Collaborative Research: Thickness, extent, and basal conditions of the Scandinavian Ice Sheet around the time of the last glacial maximum NSF Geology and Paleontology Program, 5/01-4/04, \$40,441 to WSU, \$333,341 total. Co PI with D. Mickelson, University of Wisconsin.

Collaborative Research: Developing an improved chronology of the southern margin of the Fennoscandian ice sheet, NSF Paleoclimatology Program, 7/99-6/02, \$74,295 to WSU, \$350,935 total. Co PI with Peter Clark, OSU.

Collaborative Research: Accretion of interplanetary dust: a new record from  $^3\text{He}$  in polar ice cores (Collaboration with M. Kurz, WHOI), NSF Office of Polar Programs, Antarctic Glaciology Program, 1/00-12/0, \$49,478 to WSU \$123,653 total.

Accretion of interplanetary dust: a new record from  $^3\text{He}$  in polar ice cores, and, Climate change workshop for K-12 teachers, NASA Cosmochemistry Program, 1/00-12/01, \$60,000.

Ice Core Records of Atmospheric Carbon Monoxide, NSF Earth System History Program 6/99-5/01, \$169,730.

Collaborative Research: Thermal Fractionation of firn air and the ice core record of abrupt interstadial climate change, NSF Office of Polar Programs, Antarctic Glaciology Program, 1/98-1/01, \$72,711 to WSU, \$408,607 total. Co PI with Jeff Severinghaus, UC San Diego.

Atmospheric methane variations from 800-1800 AD, NSF Office of Polar Programs, REU Supplement, 9/98-8/99, \$5,883.

## CURRICULUM VITAE

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Collaborative Research: Testing models of Fennoscandian Ice Sheet Thickness Using Cosmogenic Nuclides, NSF, Division of Earth Sciences, Geology and Paleontology Program, 1/98-1/01, \$152,234 to WSU, \$202, 291 total. Co PI with Scott Lehman, University of Colorado.

Collaborative Research: Cosmogenic nuclide chronology of ice sheet boundaries and weathering limits in the Torngat Mountains, northern Labrador: a pilot study, NSF Office of Polar Programs, Arctic Natural Sciences Program, 6/96-6/98, \$43,322 to URI/WSU, \$72,151 total. Co PI with Peter Clark, OSU.

Climate studies using Antarctic deep ice cores and firn air samples, NSF Office of Polar Programs, Antarctic Glaciology Program 4/95-4/00, \$725,000. Co PI with Michael Bender, University of Rhode Island, Graduate School of Oceanography.

Scandinavian Ice Sheet History using Cosmogenic Nuclides, National Geographic Society, 4/95-4/98, \$26,743.

Exposure Age Dating of Late Weichselian Ice Sheet Boundaries in Western Norway, NSF International Programs, 1993-1994, \$10,000.

Collaborative measurements of  $^{10}\text{Be}$ ,  $^{26}\text{Al}$ , and  $^3\text{He}$  in Antarctic Glacial Deposits, NSF International Programs, 1992-1993, \$12,100. Co PI with Mark Kurz, Woods Hole Oceanographic Institution.