

CURRICULUM VITAE

Edward J. Brook
College of Earth, Ocean, and Atmospheric Sciences
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Oregon State University
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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

2018-present Distinguished Professor, OSU, College of Earth Ocean, and Atmospheric Sciences.

2008-2018 Professor, OSU, College of Earth Ocean, and Atmospheric Sciences.

2014-2017 Director for Graduate and Undergraduate Geology Programs, College of Earth Ocean, and Atmospheric Sciences.

2004-2008 Associate Professor, OSU, 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.

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, National Academy of Sciences, *Frontiers in Science*, 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, 2012.

Jack Dymond Memorial Excellence in Mentoring Award, OSU-CEOAS, 2013.

Fellow of the American Geophysical Union, 2014.

Distinguished Professor, Oregon State University, 2018

Hans Oeschger Medal, European Geosciences Union, 2019

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PROFESSIONAL SOCIETIES

American Geophysical Union
American Association for the Advancement of Science
European Geosciences Union
Geological Society of America

GRADUATE ADVISEES AND CURRENT POSITION

Brent Goehring M.S.	2004-2006	Associate Professor, Tulane University
Logan Mitchell	Ph.D. 2007-2012	Research Professor, University of Utah
Thomas Bauska	Ph.D. 2007-2013	Scientist, British Antarctic Survey
Julia Rosen	Ph.D. 2008-2014	Independent Science Journalist
James Lee	Ph.D. 2011-2017	Research Staff, Los Alamos National Lab
Andy Menking	Ph.D. 2013-2019	Postdoc, OSU CEOAS
Nick Mehmel	Ph.D. 2017-2020	Research Assistant, Columbia University
Jon Edwards	Ph.D. 2011-present	
Jenna Epifanio	Ph.D. 2017-present	
Ben Riddell-Young	Ph.D. 2018-present	
Julia Marks Peterson	Ph.D. 2020-present	

POSTDOCTORAL ADVISEES AND CURRENT POSITION

Susan Harder	1997-2002	Instructor, Washington State Univ. (ret.)
Henriette Linge	2002-2003	Assoc. Professor, Univ. of Bergen, Norway
Hinrich Schaefer	2005-2007	Scientist, NIWA, New Zealand
Jinho Ahn	2005-2008	Assoc. Professor, Seoul National Univ., Korea
Alexi Grachev	2005- 2008	Senior Research Scientist, Inst. Of Geography, Russian Academy of Sciences
Shaun Marcott	2011-present	Assoc.. Professor, University of Wisconsin
Rachael Rhodes	2011-present	Lecturer, University of Cambridge
Adrian Schilt	2012-2013	Swiss Federal Office for the Environment
Christo Buizert	2012-2016	Assistant Professor, OSU
Aron Buffen	2015-2018	
Andy Menking	2019-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, Nicole Bintliff, Rhys Leon, Eric Rebarchik, Michelle Zahn, Izabella Lopez, Emily Rice, Sebastian Miller. High School: Claire Rodman.

SERVICE ON GRADUATE COMMITTEES (OSU unless noted; GCR not included)

Joe Licciardi	Anders Carlson
Summer Praetorius	Jason Kenworthy
Shaun Marcott	Jeremy Shakun
Meredith Payne	Maureen Davies
Sarah Strano	Nilo Bill
Aaron Barth	Andrea Balbas
Jeremy Hoffman	Gaylen Sinclair
Cedric Hagen	Mark Sweeney (WSU)
Katharine Solada	Anna Gleuder
Kaden Martin	Sarah Eggleston (University of Bern)
Peter Sperlich (University of Copenhagen)	Aurel Persoiu (University of South Florida)
Jessica Lundin (University of Washington)	Cecilia Macfarlane (University of Melbourne)
Hinrich Schaefer (University of Victoria)	Daniel Lowry (Victoria University of Wellington)
Christoph Nehrbass-Ahles (University of Bern)	

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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, 2008-2017 (Chair 2015-2017).
NEEM Ice Core Steering Committee, co-chair Gas Consortium, 2007-present.
Lead PI, NSF PIRE Award: International Collaboration and Education in Ice Core Sciences, 2010-2016.
Canadian Ice Coring Program, International Advisory Board, 2015-present.
PAGES (Past Global Changes) Steering Committee, 2016-present.
Beyond EPICA Oldest Ice Project, Liaison and Advisory Group, 2016-present.
Co-Lead PAGES/AIMES Workshop on Tipping Points in the Climate System, Hamburg, Germany, Nov. 14-16 2018.
EGRIP Ice Core Steering Committee, co-chair Gas Consortium, 2018-present.
External Advisory Committee, European ITN Training Network: DEEPICE, 2020-present.
AGU Fellows Selection Committee, Paleoceanography and Paleoclimatology Section, 2021-present.

MAJOR UNIVERSITY, COLLEGE AND DEPARTMENT SERVICE (OSU Only)

Department of Geosciences, Curriculum Committee, AY 2007-2010.
Department of Geosciences, Search Committee for Office Specialist, 2007.
Department of Geoscience, Graduate Committee, AY 2005-2006.
Chair, Department of Geosciences Space Task Force, AY 2005-2006.
Department of Geosciences, Advisory Committee, AY 2006-2007 (chair), 2007-2008.
Faculty Hiring Committee CEOAS, 2011-2012.
Peer Review of Teaching Committee, CEOAS, 2013-2014.
Strategic Planning and Hiring Committee, CEOAS, 2014-2015.
Graduate Program Committee, CEOAS, 2014-present.
Undergraduate Program Committee, CEOAS, 2014-present.
Search Committee, High Latitude Cluster Hire, 2011-2012.
Search Committee, Earth System History Faculty Member, 2014, 2015.
Program Director for Geology, CEOAS, 2014-present.
Chair, Faculty Senate Faculty Economic Welfare and Retirement Committee, 2015-2017.
Search Committee, CEOAS Dean, 2015-2016.
Chair, CEOAS External Award Committee, 2016-2017.
CEOAS Strategic Planning Committee, 2017-2018.
OSU Research Council, 2018-present.
Ad Hoc Committee for CIC Building Proposal, OSU Provost's Office, 2018-2019.
CEOAS Tenure and Promotion Committee, 2019-2020; 2021-2022.

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MAJOR INVITED PRESENTATIONS AND KEYNOTE TALKS

- AMQUA 1998 Biennial Meeting, plenary speaker. Puerta Vallarta. Sept. 5-7, 1998.
- American Museum of Natural History, Conference on Biodiversity and Climate Change: April 30-May 1, 1999.
- Berkeley Atmospheric Sciences Center Atmospheric Sciences Symposium. Nov. 9, 2001.
- Beckman/National Academy of Sciences 14th 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, invited speaker, 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.
- Plenary Lecture at the 2017 PAGES Open Science Meeting, May, 2017.
- Carelyn Y. and William S. Reeburgh Endowed Earth System Science Lecture, UC Irvine, May 24, 2018.
- University of Toronto Center for Global Change Science Distinguished Lecture Series, Feb 5 2019.
- Plenary Lecture at 13th International Conference on Paleoclimatology Sydney, Australia, September 2, 2019.

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 62, i10 index 138 (April 13, 2021).

- Buizert, C. and 40 others (including E. Brook), in revision and second review. Antarctic surface temperature and elevation during the Last 1 Glacial Maximum, *Science*.
- Brovkin, V., Brook, E. et al., in revision and third review. Past abrupt changes, tipping points and cascading impacts in the Earth system, *Nature Geoscience*.
- Fain, X., Rhodes, R. H., Philip, P., Petrenko, V. V., Fourteau, K., Chellman, N., Crosier, E., McConnell, J. R., Brook, E. J., Blunier, T., Legrand, M., and Chappellaz, J., in review. Northern Hemisphere atmospheric history of carbon monoxide since preindustrial times reconstructed from multiple Greenland ice cores, *Climate of the Past Discussions* [preprint], <https://doi.org/10.5194/cp-2021-28>.
- Yan, Y.***, Spaulding, N. E., Bender, M. L., Brook, E. J., Higgins, J. A., Kurbatov, A. V., and Mayewski, P. A., in review. Enhanced Moisture Delivery into Victoria Land, East Antarctica During the Early Last Interglacial: Implications for West Antarctic Ice Sheet Stability, *Climate of the Past Discussions* [preprint], <https://doi.org/10.5194/cp-2021-7>.
- Shackleton, S*., Menking, J. A.**, Brook, E., Buizert, C., Dyonisius, M. N., Petrenko, V. V., Baggenstos, D., and Severinghaus, J. P., in review. Evolution of mean ocean temperature in Marine Isotope Stages 5-4, *Climate of the Past Discussions* [preprint], <https://doi.org/10.5194/cp-2021-8>, in review, 2021.

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- Meissner, K.J., Brook, E., Finkelstein, S.A. and Rae, J., 2021. Carbon cycle dynamics during episodes of rapid climate change. *Environmental Research Letters*, 16(4), p.040201. (Unreviewed editorial).
- Bauska, T.K., Marcott, S.A.** and Brook, E.J., 2021. Abrupt changes in the global carbon cycle during the last glacial period. *Nature Geoscience*, 14(2), pp.91-96. (First and second authors were student and post doc respectively when most of this work was done at OSU).
- Epifanio, J.A.**, Brook, E.J., Buizert, C., Edwards, J.S., Sowers, T.A., *Kahle, E.C., Severinghaus, J.P., Steig, E.J., Winski, D.A., Osterberg, E.C. and Fudge, T.J., 2020. The SP19 chronology for the South Pole Ice Core—Part 2: gas chronology, Δ age, and smoothing of atmospheric records. *Climate of the Past*, 16(6), pp.2431-2444.
- *Ryu, Y., Ahn, J., Yang, J.-W., Brook, E. J., Timmermann, A., Blunier, T., Hur, S. and Kim, S.J., 2020. Atmospheric nitrous oxide variations on centennial time scales during the past two millennia. *Global Biogeochemical Cycles*, 34, e2020GB006568. <https://doi.org/10.1029/2020GB006568>.
- Menking, J.A.**, Brook, E.J., Schilt, A., Shackleton, S., Dyonisius, M., Severinghaus, J.P. and Petrenko, V.V., 2020. Millennial-Scale Changes in Terrestrial and Marine Nitrous Oxide Emissions at the Onset and Termination of Marine Isotope Stage 4. *Geophysical Research Letters*, 47(22), p.e2020GL089110.
- Lee, J.E.**, Brook, E.J., Bertler, N.A., Buizert, C., Baisden, T., Blunier, T., Ciobanu, V.G., Conway, H., Dahl-Jensen, D., Fudge, T.J. and Hindmarsh, R., 2020. An 83 000-year-old ice core from Roosevelt Island, Ross Sea, Antarctica. *Climate of the Past*, 16(5), 1691-1713.
- Ceperley***, E.G., Marcott, S.A., Reusche, M.M., Barth, A.M., Mix, A.C., Brook, E.J. and Caffee, M., 2020. Widespread early Holocene deglaciation, Washington Land, northwest Greenland. *Quaternary Science Reviews*, 231, 06181.
- Dyonisius***, M.N., Petrenko, V.V., Smith, A.M., Hua, Q., Yang, B., Schmitt, J., Beck, J., Seth, B., Bock, M., Hmiel, B. and Vimont, I., 2020. Old carbon reservoirs were not important in the deglacial methane budget. *Science*, 367(6480), 907-910.
- Lee, J.E.**, Edwards, J.S., Schmitt, J., Fischer, H., Bock, M. and Brook, E.J., 2020. Excess methane in Greenland ice cores associated with high dust concentrations. *Geochimica et cosmochimica acta*, 270, pp.409-430.
- Shackleton***, S., Baggenstos, D., Menking, J.A., Dyonisius, M.N., Bereiter, B., Bauska, T.K., Rhodes, R.H., Brook, E.J., Petrenko, V.V., McConnell, J.R. and Kellerhals, T., 2020. Global ocean heat content in the Last Interglacial. *Nature geoscience*, 13(1), pp.77-81.
- Marcott, S.A.***, P.U. Clark, J.D. Shakun, E.J. Brook, P.T. Davis, M.W. Caffee, 2019. ^{10}Be age constraints on latest Pleistocene and Holocene cirque glaciation across the western United States. *npj Nature Climate and Atmospheric Science*, 2, Article number:5.

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- Winstrup, M., Vallenga, P., Kjær, H.A., Fudge, T.J., Lee, J.E., Riis, M.H., Edwards, R., Bertler, N.A., Blunier, T., Brook, E.J. and Buizert, C., 2019. A 2700-year annual timescale and accumulation history for an ice core from Roosevelt Island, West Antarctica. *Climate of the Past*, 15, pp.751-779.
- Winski, D.A., Fudge, T.J., Ferris, D.G., Osterberg, E.C., Fegyveresi, J.M., Cole-Dai, J., Thundercloud, Z., Cox, T.S., Kreutz, K.J., Ortman, N. and Buizert, C., 2019. The SP19 chronology for the South Pole Ice Core—Part 1: volcanic matching and annual layer counting. *Climate of the Past*, 15(5).
- Chowdhry Beeman***, J., Gest, L., Parrenin, F., Raynaud, D., Fudge, T.J., Buizert, C. and Brook, E.J., 2019. Antarctic temperature and CO₂: near-synchrony yet variable phasing during the last deglaciation. *Climate of the Past*, 15(3).
- Fischer, H., Schmitt, J., Bock, M., Seth, B., Joos, F., Spahni, R., Lienert, S., Battaglia, G., Stocker, B.D., Schilt, A. and Brook, E.J., 2019. N₂O changes from the Last Glacial Maximum to the preindustrial—Part 1: Quantitative reconstruction of terrestrial and marine emissions using N₂O stable isotopes in ice cores. *Biogeosciences*, 16(20), pp.3997-4021.
- Yan***, Y., Bender, M.L., Brook, E.J., Clifford, H.M., Kemeny, P.C., Kurbatov, A.V., Mackay, S., Mayewski, P.A., Ng, J., Severinghaus, J.P. and Higgins, J.A., 2019. Two-million-year-old snapshots of atmospheric gases from Antarctic ice. *Nature*, 574(7780), pp.663-666.
- Menking**, J.A., Brook, E.J., Shackleton, S.A., Severinghaus, J.P., Dyonisius, M.N., Petrenko, V., McConnell, J.R., Rhodes, R.H., Bauska, T.K., Baggenstos, D. and Marcott, S., 2019. Spatial pattern of accumulation at Taylor Dome during Marine Isotope Stage 4: stratigraphic constraints from Taylor Glacier. *Climate of the Past*, 15, pp.1537-1556.
- Shackleton***, S., Bereiter, B., Baggenstos, D., Bauska, T.K., Brook, E.J., Marcott, S.A. and Severinghaus, J.P., 2019. Is the noble gas-based rate of ocean warming during the Younger Dryas overestimated?. *Geophysical Research Letters*, 46(11), pp.5928-5936.
- Brook, E.J. and Buizert, C., 2018. Antarctic and global climate history viewed from ice cores. *Nature*, 558(7709), pp.200-208.
- Bauska, T.K.**, Brook, E.J., Marcott, S.A., Baggenstos, D., Shackleton, S., Severinghaus, J.P. and Petrenko, V.V., 2018. Controls on millennial-scale atmospheric CO₂ variability during the last glacial period. *Geophysical Research Letters*, 45(15), pp.7731-7740.
- Reusche, M.M***, Marcott, S.A., Ceperley, E.G., Barth, A.M., Brook, E.J., Mix, A.C. and Caffee, M.W., 2018. Early to Late Holocene Surface Exposure Ages From Two Marine-Terminating Outlet Glaciers in Northwest Greenland. *Geophysical Research Letters*, 45(14), pp.7028-7039.
- Brook, E.J. and Buizert, C., 2018. Antarctic and global climate history viewed from ice cores. *Nature*, 558(7709), p.200.

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- Prokopiou, M***, Sapart, C. J., Rosen, J., Sperlich, P., Blunier, T., Brook, E., van de Wal, R. S. W., & Röckmann, T. (2018). Changes in the isotopic signature of atmospheric nitrous oxide and its global average source during the last three millennia. *Journal of Geophysical Research: Atmospheres*, 123. <https://doi.org/10.1029/2018JD029008>.
- Bertler, N.A., Conway, H., Dahl-Jensen, D., Emanuelsson, D.B., Winstrup, M., Vallenga, P.T., **Lee, J.E.**, Brook, E.J., Severinghaus, J.P., Fudge, T.J. and Keller, E.D., 2018. The Ross Sea Dipole-temperature, snow accumulation and sea ice variability in the Ross Sea region, Antarctica, over the past 2700 years. *Climate of the Past*, 14(2), pp.193-214.
- Seltzer, A.M.***, Buizert, C., Baggenstos, D., Brook, E.J., Ahn, J., Yang, J.W. and Severinghaus, J.P., 2017. Does $\delta^{18}\text{O}$ of O_2 record meridional shifts in tropical rainfall? *Climate of the Past*, 13(10), pp.1323-1338.
- Yang, J.W***, Ahn, J., Brook, E.J. and Ryu, Y., 2017. Atmospheric methane control mechanisms during the early Holocene. *Climate of the Past*, 13(9), pp.1227-1242.
- McConnell, J.R., Burke, A., Dunbar, N.W., Köhler, P., Thomas, J.L., ***Arienzo, M.M.**, ***Chellman, N.J.**, Maselli, O.J., Sigl, M., Adkins, J.F. and ***Baggenstos, D.**, Burkhardt, J., Brook, E., Buizert, C., Cole-Dai, J., Fudge, T.J., Knorr, G., Graf, H., Grieman, M., Iverson, N., McGwire, K., Mulvaney, R., Paris, G., Rhodes, R., Saltzman, S., Severinghaus, J., Steffensen, J., Taylor, K., Winckler, G., 2017, Synchronous volcanic eruptions and abrupt climate change~ 17.7 ka plausibly linked by stratospheric ozone depletion. *Proceedings of the National Academy of Sciences*, p.201705595.
- Petrenko, V.V., Smith, A.M., Schaefer, H., Riedel, K., Brook, E., ***Baggenstos, D.**, Harth, C., Hua, Q., Buizert, C., ***Schilt, A.** and Fain, X., 2017. Minimal geological methane emissions during the Younger Dryas–Preboreal abrupt warming event. *Nature*, 548(7668), pp.443-446.
- Schmidt, G.A., Severinghaus, J., Abe-Ouchi, A., Alley, R.B., Broecker, W., Brook, E., Etheridge, D., Kawamura, K., Keeling, R.F., Leinen, M. and Marvel, K., 2017. Overestimate of committed warming. *Nature*, 547(7662), pp.E16-E17.
- *Lundin, J.M.**, ***Stevens, C.M.**, Arthern, R., Buizert, C., Orsi, A., Ligtenberg, S.R., Simonsen, S.B., Cummings, E., Essery, R., Leahy, W. and Harris, P., 2017. Firn Model Intercomparison Experiment (FirnMICE). *Journal of Glaciology*, 63(239), pp.401-422.
- Rhodes, R.H.**, Brook, E.J., McConnell, J.R., Blunier, T., Sime, L.C., Faïn, X. and Mulvaney, R., 2017. Atmospheric methane variability: Centennial-scale signals in the Last Glacial Period. *Global Biogeochemical Cycles*, 31(3), pp.575-590.
- *Seltzer, A.M.**, Buizert, C., ***Baggenstos, D.**, Brook, E.J., Ahn, J., ***Ji-Woong, Y.** and Severinghaus, J.P., 2017. Does $\delta^{18}\text{O}$ of O_2 record meridional shifts in tropical rainfall? *Climate of the Past*, 13(10), p.1323.

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- ***Baggenstos, D., Bauska, T.K.,** Severinghaus, J.P., **Lee, J.E.,** Schaefer, H., Buizert, C., Brook, E.J., ***Shackleton, S.** and Petrenko, V.V., 2017. Atmospheric gas records from Taylor Glacier, Antarctica, reveal ancient ice with ages spanning the entire last glacial cycle. *Climate of the Past*, 13(7), p.943.
- ***Ji-Woong, Y.,** Ahn, J., Brook, E.J. and ***Ryu, Y.,** 2017. Atmospheric methane control mechanisms during the early Holocene. *Climate of the Past*, 13(9), p.1227.
- ***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}C in ancient ice from Taylor Glacier, Antarctica constrain in situ cosmogenic $^{14}\text{CH}_4$ and ^{14}CO production rates, *Geochimica et Cosmochimica Acta*, 177, 62–77.
- Rhodes, R.** X. Fañ, 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. Cafee, 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.

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- Bauska, T. K.**, F. Joos, A. C. Mix, R. Roth, J. Ahn and E. J. Brook, 2015, Links between 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 CO₂ and the N₂O/CO₂ 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 N₂O emissions during the last deglaciation, *Nature* **516**(7530): 234-237.
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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 ³He, *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.

PENDING RESEARCH PROPOSALS

Origin of methane anomalies in Greenland ice cores, NSF Artic Natural Sciences, \$356,548.

Center for Oldest Ice Exploration (COLDEX). NSF Science and Technology Centers, \$25,000,000. Final stage of review.

REU Supplement to NSF 175006 to support OSU Student Emily Rice, \$7,500.

Supplement to NSF 1745078 for Non-Academic Research Internships for Graduate Students (INTERN) Supplemental Funding Opportunity (NSF 21-013) for OSU Graduate Student Ben Riddell-Young, \$48,757.

RESEARCH GRANTS. Total since 1990 ~\$15.4M

Cave ice data recovery and analysis at Lava Beds National Monument, National Park Service, \$10,000. 5/1/2020 to 4/15/2021.

Extraterrestrial Tracers in Polar Ice, Comer Family Foundation, 7/2018 to 7/2020, \$40,000.

Deciphering Changes in Atmospheric N₂O Concentration During the Last Ice Age Using the Intramolecular Site-Preference of Nitrogen Isotopes, NSF P2C2, 5/19 to 4/22, \$423,388.

Tracing Past Methane Variations with Stable Isotopes in Antarctic Ice Cores, NSF Antarctic Glaciology, 8/18 to 7/22, \$489,383.

Collaborative Research: Snapshots of Early and Mid-Pleistocene Climate and Atmospheric Composition from the Allan Hills Blue Ice Area, NSF Antarctic Glaciology, 8/18 to 7/22, \$446,229.

Inter-Hemispheric Climate Teleconnections in response to Massive Iceberg Discharge in the North Atlantic. NSF P2C2, 4/17 to 3/20, \$460,716. Co-PI with Christo Buizert, OSU.

Advanced Light Isotope Mass Spectrometers for Environmental Research. Murdock Charitable Trust, 12/17, \$345,000. Co-PI with Alan Mix, OSU.

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

CURRICULUM VITAE

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. Co-PI with Christo Buizert, OSU.

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. Co-PI with Alan Mix and Joe Stoner, OSU.

Completing the WAIS Divide CO2 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.

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.

CURRICULUM VITAE

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 CO_2 from the WAIS Divide Ice Core. Comer Science and Education Foundation, 6/15/08 to 6/14/10, \$50,678.

Developing a record of the stable carbon isotopic composition of atmospheric CO_2 from the LGM to the Holocene, NSF Office of Polar Programs, 1/1/09-12/31/12, \$411,238. Co-PI with Alan Mix, OSU.

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).

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_2 , CH_4 , N_2O) 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. Piasias, 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.

CURRICULUM VITAE

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 Co-PI 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 CO₂ 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 Pakitsaq, 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.

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.

CURRICULUM VITAE

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-He in polar ice cores, NSF Office of Polar Programs, Antarctic Glaciology Program, 1/00-12/0, \$49,478 to WSU \$123,653 total. Co-PI with M. Kurz, WHOI.

Accretion of interplanetary dust: a new record from 3-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.

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.

CURRICULUM VITAE

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