

GEOFFREY GEBBIE

Education

1997 B.S., University of California; Atmospheric Sciences, *Magna Cum Laude*, Los Angeles, CA

2004 Ph.D., Massachusetts Institute of Technology / Woods Hole Oceanographic Institution;
Physical Oceanography, Cambridge/Woods Hole, MA

Positions Held

2018 – present Associate Scientist with Tenure, Woods Hole Oceanographic Institution –
Physical Oceanography Department, Woods Hole, MA

2014 – 2018 Associate Scientist without Tenure, Woods Hole Oceanographic Institution –
Physical Oceanography Department, Woods Hole, MA

2010 – 2014 Assistant Scientist, Woods Hole Oceanographic Institution - Physical
Oceanography Department, Woods Hole, MA

2007 – 2011 Visiting Scientist, Massachusetts Institute of Technology, Cambridge, MA

2007 – 2010 Research Scientist, Harvard University, Cambridge, MA

2004 – 2007 Postdoctoral Fellow, Harvard University, Cambridge, MA
Supervisor: Eli Tziperman

1998 – 2004 Research Assistant, MIT/WHOI Joint Program, Cambridge/Woods Hole, MA
Advisors: Carl Wunsch, Patrick Heimbach

Research Interests

The connection between physical oceanography and climate dynamics. Estimation of past ocean circulation and its role in paleoclimate, using physical models and biogeochemical records. Analysis of climate variability through state estimation, especially the synthesis of general circulation models and observations.

Honors and Awards

Tenured Associate Scientist Award, WHOI, 2018

Eos Research Spotlight, 2016

Moltz Fellow of the WHOI Ocean and Climate Change Institute, 2015 – present

Paleoceanography, Highlighted article, 2014

American Meteorological Society, Paper of Note, 2007

NASA Earth System Science Fellow, 2000 – 2003

Outstanding Student Paper, American Geophysical Union Fall Meeting, 2002

Outstanding Student Poster, World Ocean Circulation Experiment Meeting, 2002

Professional Publications and Presentations

Author or co-author of 26 refereed publications and 8 other publications. Author or co-author of approximately 55 conference abstracts; presenter at 39 national and international conferences, symposia and workshops.

Refereed Publications

Gebbie, G., P. Heimbach, and C. Wunsch, 2006: "Strategies for nested and eddy-permitting state estimation," *Journal of Geophysical Research*, **111**, C10073, doi:10.1029/2005JC003094.

Gebbie, G., and P. Huybers, 2006: "Meridional circulation during the last glacial maximum explored through a combination of $\delta^{18}\text{O}$ observations and a geostrophic inverse model," *Geochemistry, Geophysics, Geosystems*, **7**, Q11N07, doi:10.1029/2006GC001383.

Huybers, P., G. Gebbie, and O. Marchal, 2007: "Can paleoceanographic tracers constrain meridional circulation rates?" *Journal of Physical Oceanography*, **37**, 394–407, doi:10.1175/JPO3018.1. *Contribution: wrote the basis of the numerical code for the inverse model; provided guidance on modifications to the base code; co-wrote the paper including being the primary writer for the Methods section.*

Gebbie, G., 2007: "Does eddy subduction matter in the northeast Atlantic Ocean?" *Journal of Geophysical Research*, **112**, C06007, doi:10.1029/2006JC003568.

Gebbie, G., I. Eisenman, A. Wittenberg, and E. Tziperman, 2007: "Modulation of westerly wind bursts by sea surface temperature: A semi-stochastic feedback for ENSO," *J. Atmos. Sci.*, **64**, 3281–3295, doi:10.1175/JAS4029.1.

Gebbie, G., and E. Tziperman, 2009: "Predictability of SST-modulated westerly wind bursts," *Journal of Climate*, **22**, 3894–3909, doi:10.1175/2009JCLI2516.1.

Gebbie, G., and E. Tziperman, 2009: "Incorporating a semi-stochastic model of ocean-modulated westerly wind bursts into an ENSO prediction model," *Theoretical and Applied Climatology*, **97**, doi:10.1007/s00704-008-0069-6.

Gebbie, G., and P. Huybers, 2010: "Total matrix intercomparison: A method for determining the geometry of water-mass pathways," *Journal of Physical Oceanography*, **49**, 1710–1728, doi:10.1175/2010JPO4272.1.

Gebbie, G., and P. Huybers, 2011: "How is the ocean filled?" *Geophysical Research Letters*, **38**, L06604, doi:10.1029/2011GL046769.

Gebbie, G., and P. Huybers, 2012: "The mean age of ocean waters inferred from radiocarbon observations: upper and lower bounds, sensitivity to surface sources, and accounting for mixing histories," *Journal of Physical Oceanography*, **42**, 291–305, doi:10.1175/JPO-D-11-043.1.

Gebbie, G., 2012: "Tracer transport timescales and the observed Atlantic-Pacific lag in the timing of the Last Termination," *Paleoceanography*, **27**, doi:10.1029/2011PA002273.

- Lopez, H., B.P. Kirtman, E. Tziperman, and G. Gebbie, 2013: "Impact of Interactive Westerly Wind Bursts on CCSM3," *Dynamics of Atmospheres and Oceans*, **59**, 24–51, doi: 10.1016/j.dynatmoce.2012.11.001. *Contribution: Ported my westerly wind burst code from the Modular Ocean Model to the Community Climate System Model; performed a tutorial in Miami, FL, to author #1 and #2 for use of the model; provided feedback on all drafts of the manuscript.*
- Gebbie, G., 2014: "How much did Glacial North Atlantic Water shoal?" *Paleoceanography*, **29**, doi:10.1002/2013PA002557. *Editor's research highlight.*
- Thornalley, D.J.R., H. Bauch, G. Gebbie, W. Guo, M. Ziegler, S. Bernasconi, S. Barker, L. Skinner and J. Yu, 2015: "A poorly ventilated deep Arctic Mediterranean during the last glacial," *Science*, **349**, 706–710. *Contribution: Wrote and implemented two numerical models of the Arctic Ocean, a 1D column model and a 3D model with connections to the global ocean; confirmed that the findings of the lead author are physically plausible given assumptions about Arctic throughflow; provided 1 figure and text; offered comments and revisions on the manuscript.*
- Gebbie, G., C.D. Peterson, L.E. Lisiecki, and H.J. Spero, 2015: "Global-mean $\delta^{13}\text{C}$ and its uncertainty in a glacial state estimate," *Quaternary Science Reviews*, **125**, doi://10.1016/j.quascirev.2015.08.010.
- Kronenberger, M., C. Weber, G. Gebbie, O. Kreylos, L.H. Kellogg, L.E. Lisiecki, C.D. Peterson, H.J. Spero, B. Hamann, and H. Hagen, 2015: "A novel distance measure for ocean reconstruction from sparse observations demonstrated on the Atlantic," in: Talbot, J., Keahey, A. and Wright, W., eds., Proceedings of IEEE Scientific Visualization 2015 (SciVis 2015) - Visualization in Practice, IEEE Computer Society Press, Los Alamitos, California. *Contribution: Provided physical oceanographic expertise to link the computer scientist lead author to paleoceanographic data; provided modern-day hydrographic datasets to the lead author; read and revised the manuscript.*
- Amrhein, D.E.* , G. Gebbie, O. Marchal, and C. Wunsch, 2015: "Inferring surface water equilibrium calcite $\delta^{18}\text{O}$ during the last deglacial period from benthic foraminiferal $\delta^{18}\text{O}$ records: Implications for ocean circulation," *Paleoceanography*, **30**, 1470–1489, doi:10.1002/2014PA002743. (*-graduate student advisee) *Contribution: Served as co-advisor to M.S. student; provided the mathematical basis of the work, all of the numerical codes, and a modern-day circulation estimate; co-wrote the paper.*
- Streletz, G.J.* , G. Gebbie, B. Hamann, and O. Kreylos, 2016: "Interpolating Sparse Scattered Data Using Flow Information," *J. Computational Sci.*, **16**, 156–169, doi:10.1016/j.jocs.2016.04.001. *Contribution: Served as co-advisor to the graduate student with B. Hamann; directed the oceanographic component of the research including the usage of observational datasets and adaptation of oceanographic statistical techniques for computer science; co-wrote and revised manuscript. (*-graduate student advisee)*
- Gebbie, G., G.J. Streletz*, and H.J. Spero, 2016: "How well would modern-day property distributions be known with paleoceanographic-like observational sampling?" *Paleoceanography*, **31**, doi:10.1002/2015PA002917. *Highlighted in Eos.*
- Gebbie, G., and T.-L. Hsieh⁺, 2017: "Controllability, not chaos, key criterion for ocean state

estimation,” *Nonlinear Processes in Geophysics*, **24**, 351–366, doi:10.5194/npg-24-351-2017. (+ -Summer Student Fellow)

Purkey, S.G., W.M. Smethie, G. Gebbie, A.L. Gordon, R.E. Sonnerup, M. J. Warner, and J.L. Bullister, 2018: “A Synoptic View of the Ventilation and Circulation of Antarctic Bottom Water from Chlorofluorocarbons,” *Annual Review of Marine Science*, doi:10.1146/annurev-marine-121916-063414. *Contribution: Analyzed decades of CFC-11 data and produced a time-evolving objective map of their spread; wrote multiple sections of the paper; provided revisions on the entire manuscript.*

Zhao, N., O. Marchal, L. D. Keigwin, D. E. Amrhein, and G. Gebbie, 2018: “A synthesis of deglacial deep-sea radiocarbon records and a test of their (in)consistency with modern ocean ventilation,” *Paleoceanography and Paleoclimatology*, **33**, <https://doi.org/10.1002/2017PA003174>. *Contribution: Served as thesis committee member to the lead author; provided empirical ocean circulation for comparison to radiocarbon data; revised and commented on manuscript.*

Oppo, D.W., G. Gebbie, K-F. Huang, W.B. Curry, T.M. Marchitto, and K.R. Pietro, 2018: “Data constraints on Glacial Atlantic Water Mass Geometry and Properties,” *Paleoceanography and Paleoclimatology*, **33**, 1013-1034, doi:10.1029/2018PA003408.

Gebbie, G., and P. Huybers, 2019: “The Little Ice Age and 20th Century deep Pacific cooling,” *submitted*.

Simms, A.R., and L.E. Lisiecki, G. Gebbie, P.L. Whitehouse, and J.F. Clark, 2019: “Balancing the last glacial maximum (LGM) sea-level budget,” *Quaternary Science Reviews*, 205, 143-153, doi:10.1016/j.quascirev.2018.12.018 .

Gebbie, G., 2019: “Atlantic warming since the Little Ice Age,” *submitted to Oceanography*.

Gebbie, G., A. R. Simms, and L. E. Lisiecki, 2019: “Why deglacial ice loss estimates are biased low,” *submitted to Earth and Planetary Science Letters*.

Lacerra, M., D. Lund, G. Gebbie, D. Oppo, J. Yu, A. Schmittner, and N. Umling, 2019: “Less remineralized carbon in the intermediate depth South Atlantic during Heinrich Stadial 1,” *submitted to Paleoceanography and Paleoclimatology*.

Other Publications

Gebbie, G., 2000: “Can an eddy-resolving general circulation model adequately represent the Labrador Sea deep convection cycle?” Technical Report, MIT, 46pp.

Gebbie, G., 2004: “Subduction in an eddy-resolving state estimate of the northeast Atlantic Ocean,” Ph.D. dissertation, MIT-WHOI Joint Program in Oceanography, 196pp.

Gebbie, G., 2005: “A multi-platform parallel computational benchmark of the GFDL modular ocean model version 4 (MOM4),” Harvard University, 22pp.

Gebbie, G., and the ECCO-GODAE Group, 2006: “The MOM4 tangent-linear and adjoint project,” Technical Report, Harvard University, 25pp.

- Gebbie, G., and I. Eisenman, A. Wittenberg, and E. Tziperman, 2007: “Could ocean modulated wind bursts lead to improved forecasts of El Niño?” *Bulletin of the American Meteorology Society*, **88**, 1356–1357.
- Bronimann, S., J. Franke, P. Breitenmoser, G. Hakim, H. Goosse, M. Widmann, M. Crucifix, G. Gebbie, A. Paul, J. Annan, and G. van der Schrier, 2013: “Transient state estimation in paleoclimatology using data assimilation,” *PAGES (Past Global Changes) news*, **21** (2), 74–75.
- Edwards, T., J. Annan, M. Crucifix, G. Gebbie, H. Goosse, and A. Paul, 2013: “Best-of-both-worlds estimates of timeslices of the past,” *PAGES (Past Global Changes) news*, **21** (2), 76–77.
- Stanley, S., 2016: “Reconstructing the ocean’s murky past,” *Eos*, *97*, doi:10.1029/2016EO051923, https://eos.org/research-spotlights/reconstructing-the-oceans-murky-past#disqus_thread. Based on: Gebbie, G., G.J. Stretetz, and H.J. Spero, 2016: “How well would the modern-day property distributions be known with paleoceanographic-like observational sampling?”, *Paleoceanography*.

Teaching and Advising Activities

Education

- Instructor, MIT/WHOI Joint Program class 12.805, “Data Analysis in Physical Oceanography,” 2016, 2017
- Organizing Committee and Lecturer, Advanced Climate Dynamics Course (ACDC), 2009–present: Bergen, Norway, 2009; Lyngen, Norway, 2010; Friday Harbor, WA, 2011; Snoheim, Norway, 2012; Lofoten, Norway, 2013; Disko Island, Greenland, 2014; Heradskolinn, Iceland, 2015; Bonne Bay, Newfoundland, 2016; Rondane National Park, Norway, 2017; Hardangervidda, Norway, 2018
- Instructor, MIT/WHOI Joint Program class 12.808, “Introduction to Observational Physical Oceanography,” 2013, 2014, 2015
- MIT/WHOI Joint Program Admissions Advisory Committee, 2014–2015
- Summer Student Fellow Coordinator, Physical Oceanography, 2011–2013
- Lecturer, British Petroleum Short Course on “Ocean interannual variability,” 2011–2012
- American Museum of Natural History, instructor for class “The Ocean System”, 2008–2010

Advising

- Maya Chung, Summer Student Fellow, 2018
- Laura Fleming, M.S. co-advisor, Physical Oceanography, MIT/WHOI, 2017–present
- Ailin Brakstad, Ph.D. co-advisor, 2017–present
- Greg Stretetz, Ph.D. co-advisor, UC Davis, 2011–present
- Marianna Linz, Ph.D. thesis committee, MIT/WHOI, 2014–2017
- Ning Zhao, Chair of the Ph.D. Defense, 2016
- Yuxin Zhou, Summer Student Fellow, 2015
- Daniel Amrhein, M.S. co-advisor, Physical Oceanography, MIT/WHOI, 2013
- Alice Alpert, general project advisor, Marine Geology & Geophysics, MIT/WHOI, 2013
- Tsung-Lin Hsieh, Summer Student Fellow, 2013
- Joseph Wenig, Summer Student Fellow, 2012
- Fern Gibbons, Ph.D. thesis committee, Marine Geology & Geophysics, MIT/WHOI, 2012

Holly Dail, Ph.D. thesis committee, Physical Oceanography, MIT/WHOI, 2012

Other Professional Activities

Society Memberships:

Member, American Geophysical Union
 Member, Phi Beta Kappa
 Member, Golden Key National Honor Society

Reviewer – 6 agencies:

National Environment Research Council (U.K.), National Oceanographic and Atmospheric Administration, National Science Foundation, National Aeronautics and Space Administration (panel member, 2013), WHOI Director of Research (panel member, 2013), WHOI Ocean and Climate Change Institute (panel member, 2015)

Reviewer – 23 journals:

Biogeosciences, Climate Dynamics, Earth and Planetary Science Letters, Environmental Research Letters, Geochemistry Geophysics Geosystems, Geochimica et Cosmochimica Acta, Geophysical Research Letters, Geoscientific Model Development Discussions, Journal of Atmospheric and Oceanic Technology, Journal of the Atmospheric Sciences, Journal of Climate, Journal of Geophysical Research-Atmospheres, Journal of Geophysical Research-Oceans, Journal of Marine Research, Journal of Marine Systems, Journal of Physical Oceanography, Nature, Ocean Modelling, Paleoceanography, Quarterly Journal of the Royal Meteorological Society, Science, Science Advances, Tellus

Community Activities: Member, US CLIVAR Paleo-AMOC Task Team, 2018 – present; Working Group Member, PAGES (Past Global Changes) Ocean Circulation and Carbon Cycling (OC3), 2014 – present; Chairperson, American Geophysical Union Ocean Sciences Meeting Session, Oceanic uptake of heat and greenhouse gases: Dynamic and thermodynamic controls and inferences from tracers, 2012; Chairperson, American Geophysical Union Ocean Sciences Meeting Session, The scientific and practical relevance of ocean data assimilation, 2010; Convener, American Geophysical Union Fall Meeting Session, General Physical Oceanography, 2005; Member, Estimating the Circulation and Climate of the Ocean (ECCO) Consortium, 1998 – 2004.

WHOI Committees: Workplace Climate Committee, 2018 – present; Defined Contribution Retirement Plan Committee, 2018 – present; Scientific Staff Executive Committee, 2015 – 2018; Ocean and Climate Change Institute (OCCI) advisory committee, 2015 – 2016; MIT-WHOI Joint Program Admissions committee, 2014 – 2016; Linda Morse-Porteus award selection committee, 2015; Advisory Committee for the WHOI shared computing resource “Scylla”, 2011 – 2015; Elected Member, MIT/WHOI Joint Program Alumni Association Committee, 2009 – 2015; Paleolunch Seminar Series Organizer, 2010 – 2013, Climate Initiative member and workshop organizer.

Field Experience

2001 R/V Oceanus Cruise 369, Reykjavik to Reykjavik, Iceland (Irminger Sea), 28 days at sea

Published Abstracts/Professional Talks

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- Gebbie, G., D. Stammer, J. Sheinbaum, and C. Wunsch, 2000: "Can an eddy-resolving ocean general circulation model adequately represent the 1996-97 Labrador Sea Deep convection cycle?" Labrador Sea Deep Ocean Convection Workshop, Toronto, Canada.
- Gebbie, G., C. Hill, P. Heimbach, and C. Wunsch, 2002: "Combining observations and simulation in a fully eddy resolving North Atlantic regional model," AGU Ocean Sciences Meeting, Abstract OS31S-04, Honolulu, HI.
- Gebbie, G., C. Wunsch, and Heimbach, P., 2002: "An eddy-resolving state estimate of the ocean circulation during the subduction experiment using a North Atlantic regional model (ECCO)," *Eos Trans. AGU*, AGU Fall Meet. Suppl., Abstract OS22F-13, San Francisco, CA, *Outstanding Student Paper Award*.
- Gebbie, G., C. Wunsch, and Heimbach, P., 2002: "An eddy-resolving state estimate of the ocean circulation during the subduction experiment using a North Atlantic regional model (ECCO)," World Ocean Circulation Experiment (WOCE) Meeting, San Antonio, TX, *Outstanding Student Poster Award*.
- Gebbie, G., C. Wunsch, and P. Heimbach, 2003: "Estimates of eddy-driven subduction in the eastern North Atlantic Ocean," *EOS Trans. AGU*, **84 (52)**, AGU Ocean Sci. Meet. Suppl., Abstract OS41N-05, Portland, OR. Also presented at Bjerknes Centenary, Bergen, Norway, and Climate Variability (CLIVAR) Conference, Baltimore, Maryland, poster, 2004.
- Gebbie, G., I. Eisenman, A. Wittenberg, and E. Tziperman, 2005: "Westerly wind bursts: ENSO's tail rather than the dog?" EGU Assembly, Vienna, Austria.
- Gebbie, G., I. Eisenman, A.T. Wittenberg, and E. Tziperman, 2005: "Modulation of westerly wind burst occurrence by sea surface temperature as an intrinsic part of ENSO dynamics," *Eos Trans. AGU*, **87 (52)**, AGU Fall Meet. Suppl., Abstract OS44A-06, San Francisco, CA.
- Gebbie, G., and P. Huybers, 2006: "Meridional circulation during the last glacial maximum explored through a combination of South Atlantic Delta-18-O observations and a geostrophic inverse model," *Eos Trans. AGU*, **87 (52)**, AGU Fall Meet. Suppl., Abstract PP34A-05, *invited presentation*, San Francisco, CA.
- Gebbie, G., and E. Tziperman, 2006: "Improving ENSO predictions by modeling the modulation of westerly wind bursts by sea surface temperature," *Eos Trans. AGU*, **87 (52)**, AGU Fall Meet. Suppl., Abstract A41E-0089, poster, San Francisco, CA.
- Gebbie, G., and E. Tziperman, 2007: "The impact of ocean-modulated wind bursts on ENSO prediction," *solicited presentation*, European Geophysical Union Assembly, Vienna, Austria.
- Gebbie, G., 2007: "Controllability, not chaos, key criterion for ocean state estimation," poster, EGU Assembly, Vienna, Austria.
- Gebbie, G., and P. Huybers, 2007: "The adjustment of ocean tracers at millennial timescales,"

- Eos Trans. AGU*, **88 (52)**, AGU Fall Meet. Suppl., Abstract PP12A-08, San Francisco, CA.
- Tziperman, E., Z. Kuang, P. Huybers, L. Yu, and G. Gebbie, 2007: "On the predictability and dynamics of westerly wind bursts in the equatorial Pacific," *Eos Trans. AGU*, AGU Fall Meet. Suppl., Abstract GC51A-0166.
- Gebbie, G., and P. Huybers, 2008: "A reconstruction of ocean surface boundary conditions over the last millennium and beyond using observations of radiocarbon, conservative tracers, and nutrients," *Eos Trans. AGU*, **89 (53)**, American Geophysical Union Fall Meeting Suppl., Abstract PP52B-02, *invited presentation*, San Francisco, CA.
- Gebbie, G., and P. Huybers, 2008: "The power of climatological tracer observations to constrain ocean transport pathways: Adapting Hide's theorem to an inverse model," *Eos Trans. AGU*, **89 (53)**, AGU Fall Meeting Suppl., Abstract H21B-0820, poster, San Francisco, CA.
- Gebbie, G., 2008: "What is the age of the deep ocean? Interpretation of radiocarbon in a turbulent fluid," *invited presentations*, University of California, Santa Cruz and Scripps Institution of Oceanography.
- Gebbie, G., 2009: "Millennial timescale changes in the Atlantic meridional overturning circulation: Quantifying past circulation using sediment core data," poster, CLIVAR AMOC Workshop, Annapolis, Maryland.
- Gebbie, G., 2009: "The predictability of ocean-modulated westerly wind bursts and the implications for ENSO forecasts," *invited presentation*, Canadian Meteorological and Oceanographical Society Congress, Halifax, NS, Canada.
- Gebbie, G., 2009: "The imprint of climate change over the last millennium in modern-day ocean tracer distributions," *invited presentation*, University of Texas, Austin.
- Gebbie, G., 2010, "How is the ocean filled?: The practical relevance of the steady-state ocean circulation that best fits tracer climatologies," American Geophysical Union Ocean Sciences Meeting, Portland, OR, Abstract PO34F-08.
- Gebbie, G., 2010: "How is the ocean filled?: Connections between water masses and present and past climate," *invited presentations*, Woods Hole Oceanographic Institution, University of Arizona and University of Cambridge.
- Gebbie G., and T. Lee, 2010: "Is the intergyre gyre real?: Evidence from ocean state estimates," poster, CLIVAR AMOC workshop, Miami, FL.
- Gebbie, G., 2010: "Circulation scenarios for explaining the LGM delta-13-C sediment-core data," poster, International Conference on Paleoceanography X, La Jolla, CA.
- Gebbie, G., 2010: "The timing of events of the Last Termination as inferred through sediment core records," American Geophysical Union Fall Meeting, 2010 Fall Meeting, San Francisco, CA, Abstract PP24A-02.
- Gebbie, G., 2011: "Tracking glacial ocean waters from surface source to seafloor: an inverse

- method applied to the last 25,000 years,” *invited* presentation, European Geophysical Union Meeting, Vienna, Austria.
- Gebbie, G., A. Jenkins, and F. Straneo, 2011: “Tracking the path of Ice Shelf Water from the source to the deep ocean,” International Glaciological Symposium, La Jolla, CA.
- Gebbie, G., and T. Lee, 2011: “The intergyre gyre in ocean data assimilation products,” CLIVAR AMOC workshop, Southampton, UK, poster.
- Gebbie, G., 2011: “How Geochemical Proxies Provide Quantifiable Evidence of Climate Shifts Over the Last 25,000 Years,” *keynote lecture*, Goldschmidt Conference, Prague, Czech Republic.
- Gebbie, G., 2012: “Interpreting Radiocarbon Observations with Many Surface Sources, with Application to Paleoceanographic Tracer Evolution,” *invited seminar*, California Institute of Technology, Pasadena, CA.
- Gebbie, G., 2012: “A Global Estimate of Ocean Age and Transit Times Inferred from Radiocarbon Observations,” presentation, AGU Ocean Sciences meeting, Salt Lake City, UT.
- Gebbie, G., 2012: “Which Paleo Data Types Best Detect Past Circulation Changes?” *invited presentation*, The Paleoclimate Modeling Intercomparison Project, Phase 3; Comparing Ocean Models with Paleo-Archives 2012 (COMPARE 2012), Bremen, Germany.
- Gebbie, G., 2012: “Interpreting Radiocarbon Observations with Many Surface Sources, and Application to Paleoceanographic Tracer Evolution,” *invited presentation*, Alfred Wegener Institute, Bremerhavn, Germany.
- Gebbie, G., 2012: “Constraints from Paleotracer Data on the Atlantic Circulation during the Last Glacial Maximum Revisited,” MIT Sack Lunch Seminar.
- Streletz, Gregory J.**, Geoffrey Gebbie, Howard J. Spero, Oliver Kreylos, Louise H. Kellogg, and Bernd Hamann, 2012: “Interpolating Sparse Scattered Oceanographic Data Using Flow Information,” poster, AGU Fall Meeting, Abstract NG31A-1576. (*-UC Davis graduate student co-advisee)
- Gebbie, G., 2012: “How many water masses fill the ocean?: A spectral unmixing approach,” poster, AGU Fall Meeting, San Francisco, CA, Abstract NG41C-1564.
- Wenig, J.**, and G. Gebbie, 2012: “Evidence for interaction between Filchner-Ronne Ice Shelf Water and the large-scale ocean circulation,” poster, AGU Fall Meeting, San Francisco, CA, Abstract C43D-0659. (*-Summer Student Fellow advisee)
- Oppo, D.W., W.B. Curry, K.-F. Huang, G. Gebbie, and L.D. Keigwin, 2012: “Glacial-Holocene Deep Atlantic Variability,” *invited presentation*, AGU Fall Meeting, San Francisco, CA, Abstract PP43C-05.
- Gebbie, G., 2013: “Just how different was the glacial ocean circulation?” *invited presentation*, Department of Earth System Science, University of California, Irvine, CA.

- Oppo, D.W., and G. Gebbie, 2013: "What do benthic C13 records tell us about glacial and deglacial Atlantic deepwater circulation?" Workshop on Isotopes of Carbon, Water, and Geotracers in Paleoclimate Research, University of Bern, Switzerland.
- Gebbie, G., 2013: "The Water-Mass Geometry of the Glacial Atlantic in Three Dimensions", poster, 11th International Conference on Paleoceanography, Sitges-Barcelona, Spain, Abstract P-052.
- Gebbie, G., 2013: "How much did Glacial North Atlantic Water shoal?: Analysis of an LGM model constrained by observations," Paleoclimate Model Intercomparison Project (PMIP) Ocean Workshop, Corvallis, OR.
- Streletz, G.*, G. Gebbie, B. Hamann, O. Kreylos, L.H. Kellogg, and H.J. Spero, 2013: "Flow-Based Ocean Reconstructions from Sparse Observations," AGU Fall Meeting, San Francisco, CA, Abstract NG21A-1474. (*-graduate student advisee)
- Peterson, C.D., L. E. Lisiecki, and G. Gebbie, 2013: "Two Techniques for Estimating Deglacial Mean-Ocean $\delta^{13}\text{C}$ Change from the Same Set of 493 Benthic $\delta^{13}\text{C}$ Records," AGU Fall Meeting, San Francisco, CA, Abstract PP21E-06.
- Gebbie, G., 2014: "How well would the modern-day circulation be resolved if we were limited to paleoceanographic-like observational sampling?" AGU Ocean Sciences meeting, Oral presentation, Abstract ID:16877, Session 090: Data Assimilation and Uncertainty Quantification in Ocean Modeling, Honolulu, HI.
- Gebbie, G., 2014: "How much did Glacial North Atlantic Water shoal?" Harvard University ClimaTea series, *invited seminar*.
- Gebbie, G., C. D. Peterson, L. E. Lisiecki, 2014: "How to improve the initialization of deglacial model simulations," Ocean Circulation and Carbon Cycling (OC3) Working Group of PAGES, Bern, Switzerland.
- Oppo., D.W., G. Gebbie, and W. Curry, 2014: "Deglacial evolution of Atlantic mid-depth and intermediate-depth water variability," AGU Fall Meeting, San Francisco, CA, Abstract PP13D-01.
- Streletz, G., M. Kronenberger, C. Weber, G. Gebbie, B. Hamann, O. Kreylos, L.H. Kellogg, and H.J. Spero, 2014: "Comparison of methods for ocean reconstruction from sparse observations," AGU Fall Meeting, San Francisco, CA, Abstract PP11B-1356A, poster.
- Gebbie, G., C. Peterson, L. Lisiecki, and H.J. Spero, 2014: "Toward the inference of deglacial ocean dynamics from the spatial pattern of LGM-to-modern d^{13}C and d^{18}O change," AGU Fall Meeting, San Francisco, CA, Abstract PP14B-06.
- Amrhein, D., G. Gebbie, O. Marchal, and C. Wunsch, 2014: "Inferring surface water equilibrium calcite d^{18}O during the last deglacial period from benthic foraminiferal d^{18}O records," AGU Fall Meeting, San Francisco, CA, Abstract PP11B-1355, poster.
- Gebbie, G., 2015: "Keynote lecture: The North Atlantic window to the deep ocean reservoir," Ocean Outlook workshop, Bergen, Norway.

- Gebbie, G., 2016: "Why Do Water Masses Successfully Describe a Spatially-Complex, Process-Rich Ocean?," PO13E-04, AGU Ocean Sciences Meeting, New Orleans, LA, *oral presentation*.
- Zhou, Y, D. Oppo, G. Gebbie, and D. Thornalley, 2016: "Magnitude of the Sues Effect in North Atlantic - a Study of Foraminifera and Transient Tracer Simulations," AH34A-0062, AGU Ocean Sciences Meeting, New Orleans, LA, *oral presentation*.
- Gebbie, G., 2016: "A poorly-ventilated Arctic Mediterranean and the demise of the Last Ice Age," Ocean Outlook meeting, Woods Hole, MA, *invited presentation*, April.
- Gebbie, G., G. J. Stretz, and H. J. Spero, 2016: "How well would the modern-day property distributions be known with paleoceanographic-like observational sampling?" U.S. CLIVAR AMOC meeting, Boulder, CO, *poster*.
- Gebbie, G., 2016: "Connecting the ocean circulation of mass to the circulation of tracers: past and present," Goldschmidt Conference, Yokohama, Japan, *keynote lecture*.
- Chalk, T., B. Greenwood, and G. Gebbie, 2016: "Global carbonate ion reconstructions of the Last Glacial Maximum," Goldschmidt Conference, Yokohama, Japan, *oral presentation*.
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