Dr. Sophia K.V. Hines

Woods Hole Oceanographic Institution
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EDUCATION

California Institute of Technology 2011–2018
Ph.D. in Geochemistry, Division of Geological and Planetary Sciences
Thesis title: "Glacial Ocean Dynamics: Insight from Deep-Sea Coral Reconstructions and A Time-Dependent Dynamical Box Model"
Advisor: Jess Adkins

Carleton College 2007–2011
B.A. in Chemistry, *Magna cum laude*

PROFESSIONAL APPOINTMENTS

Woods Hole Oceanographic Institution April 2021–present
Assistant Scientist, Department of Marine Chemistry & Geochemistry

Lamont-Doherty Earth Observatory of Columbia University April 2018–March 2021
Lamont Postdoctoral Research Fellowship

California Institute of Technology Nov. 2017–March 2018
Postdoctoral researcher in Global Environmental Science

PEER-REVIEWED PUBLICATIONS

1. K. Costa, S. G. Nielsen, Y. Wang, W. Lu, **S. Hines**, A. Jacobel, D. Oppo, Potential use of uranium to barium ratios as a quantitative proxy for bottom water oxygen concentrations in marine sediments over Pleistocene glacial-interglacial cycles, *Geochemica et Cosmochimica Acta* (*2022*).

2. P. Rafter, W. Gray, **S. Hines**, A. Burke, K. Costa, J. Gottschalk, M. Hain, J. Rae, J. Southon, M. Walczak, J. Yu, J. Adkins, T. DeVries, Global reorganization of deep-sea circulation and carbon storage after the last ice age, *Science Advances* (2022).

3. B. Pasquier, **S. K. V. Hines**, H. Liang, Y. Wu, S. G. John, and S. L. Goldstein, GNOM v1.0: An optimized steady-state model of the modern marine neodymium cycle, *Geoscientific Model Development* (2022).

4. T. Struve, D. J. Wilson, **S. K. V. Hines**, J. F. Adkins, and T. van de Flierdt, A deep Tasman outflow of Pacific waters during the last glacial period, *Nature Communications* (2022).

5. F. J. Pavia, C. S. Jones, and **S. K. Hines**, Geometry of the Meridional Overturning Circulation at the Last Glacial Maximum, *Journal of Climate* (2022).

6. S. Barker, A. Starr, J. van der Lubbe, A. Doughty, G. Knorr, S. Conn, S. Lordsmith, L. Owen, A. Nederbragt, S. Hemming, I. Hall, L. Levay, and **the IODP Expedition 361 Shipboard Scientific Party**, Persistent influence of precession on northern ice sheet variability since the early Pleistocene, *Science* (2022).

7. **S. K. Hines**, L. Bolge, S. L. Goldstein, C. D. Charles, I. R. Hall, S. R. Hemming, Little change in ice age water mass structure from Cape Basin benthic neodymium and carbon isotopes, *Paleoceanography and Paleoclimatology*, (2021).

8. A. Cartagena-Sierra, M. A. Berke, R. S. Robinson, B. Marcks, I. S. Castañeda, A. Starr, I. R. Hall, S. R. Hemming, L. J. LeVay, **Expedition 361 Scientific Party**, Variations in latitudinal migrations of the subtropical front at the Agulhas Plateau through the mid-Pleistocene Transition, *Paleoceanography and Paleoclimatology*, (2021).

9. A. K. Taylor, M. A. Berke, I. S. Castañeda, A. Koutsodendris, H. Campos, I. R. Hall, S. R. Hemming, L. J. LeVay, **Expedition 361 Scientists**, Plio-Pleistocene continental hydroclimate and Indian Ocean sea surface temperatures at the southeast African margin, *Paleoceanography and Paleoclimatology* (2021).

10. A. Starr, I. R. Hall, S. Barker, T. Rackow, X. Zhang, S. R. Hemming, H. J. L. van der Lubbe, G. Knorr, M. A. Berke, G. R. Bigg, A. Cartagena-Sierra, F. J. Jiménez-Espejo, X. Gong, J. Gruetzner, N. Lathika, L. J. LeVay, R. S. Robinson, M. Ziegler, **Expedition 361 Scientific Party**, Antarctic icebergs reorganize ocean circulation during Pleistocene glacials, *Nature* (2021).

11. A. Koutsodendris, K. Nakajima, S. Kaboth-Bahr, M. A. Berke, A. M. Franzese, I. R. Hall, S. R. Hemming, J. Just, L. J. LeVay, J. Pross, R. S. Robinson, **IODP Expedition 361 Scientists**, A Plio-Pleistocene (c. 04 Ma) cyclostratigraphy for IODP Site U1478 (Mozambique Channel, SW Indian Ocean): Exploring an offshore record of paleoclimate and ecosystem variability in SE Africa, *Newsletters on Stratigraphy* (2020).

12. **S. K. Hines**, J. M. Eiler, J. R. Southon, and J. F. Adkins, Dynamic intermediate waters across the late glacial revealed by paired radiocarbon and clumped isotope temperature records, *Paleoceanography and Paleoclimatology* (2019).

13. A. F. Thompson, **S. K. Hines**, and J. F. Adkins, A Southern Ocean mechanism for climate transients through the last glacial, *Journal of Climate* (2019).

14. **S. K. Hines**, A. F. Thompson, and J. F. Adkins, The role of the Southern Ocean in abrupt transitions and hysteresis in glacial ocean circulation, *Paleoceanography and Paleoclimatology* (2019).

15. J. Gruetzner, F. J. Jimenez Espejo, N. Lathika, G. Uenzelmann-Neben, I. R. Hall, S. R. Hemming, L. J. LeVay, and **the Expedition 361 Scientists**, A New Seismic Stratigraphy in the Indian-Atlantic Ocean Gateway Resembles Major Paleo-Oceanographic Changes of the Last 7 Ma,*Geochemistry, Geophysics, Geosystems*, (2019).

16. D. N. Tangunana, K.-H. Baumann, J. Just, L. J. LeVay, S. Barker, L. Brentegana, D. De Vleeschouwer, I. R. Hall, S. Hemming, R. Norris, **the Expedition 361 Shipboard Scientific Party**, The last 1 million years of the extinct genus *Discoaster*: Plio-Pleistocene environment and productivity at Site U1476 (Mozambique Channel), *Palaeogeography, Palaeoclimatology, Palaeoecology*, (2018).

17. I. R. Hall, S. R. Hemming, L. J. LeVay, and **the Expedition 361 Scientists**, 2017. South African Climates (Agulhas LGM Density Profile). Proceedings of the International Ocean Discovery Program, 361: College Station, TX (International Ocean Discovery Program).

18. X. T. Wang, D. M. Sigman, M. G. Prokopenko, J. F. Adkins, L. F. Robinson, **S. K. Hines**, J. Chai, A. S. Studer, A. Martinez-Garcia, G. H. Haug, Deep-sea coral evidence for lower Southern Ocean surface nitrate concentrations during the last ice age, *PNAS*, (2017).

19. T. Struve, T. van de Flierdt, L. F. Robinson, L. I. Bradtmiller, **S. K. Hines**, J. F. Adkins, M. Lambelet, K. C. Crocket, K. Kreissig, B. Coles, M. E. Auro, Neodymium isotope analyses after combined extraction of actinide and lanthanide elements from seawater and deep-sea coral aragonite, *Geochemistry, Geophysics, Geosystems*, (2015).

20. **S. K. Hines**, J. R. Southon, J. F. Adkins, Time series of radiocarbon in Southern Ocean intermediate water for the past 30,000 years, *Earth and Planetary Science Letters*, (2015).

21. S. Bush, G. M. Santos, X. Xu, J. Southon, N. Thiagarajan, **S. K. Hines**, J. F. Adkins, Simple, rapid and cost effective: A screening method for ^{14}C analysis of small carbonate samples, *Radiocarbon*, (2013).

PUBLICATIONS IN REVIEW AND IN PREPARATION

1. Y. Wang, K. M. Costa, W. Lu, **S. K. Hines**, S. G. Nielsen, Global oceanic oxygenation controlled by the Southern Ocean through the last deglaciation, *Science Advances* (*in review*).
2. **S. K. Hines**, C. D. Charles, A. Starr, S. L. Goldstein, S. R. Hemming, I. R. Hall, N. Lathika, M. Passacantando, L. Bolge, A comprehensive assessment of deep ocean circulation across the Mid-Pleistocene Transition, *Nature Geoscience* (*submitted*).

NON-PEER-REVIEWED PUBLICATIONS

1. **S. K. Hines**, S. Shackleton, P. C. Tzedakis, Interglacials of the 41 kyr-world and the Middle Pleistocene Transition, QUIGS Workshop Report, *PAGES Magazine*, (2023).

GRANTS AND FELLOWSHIPS

NSF MGG Award: "Collaborative Research: A porewater perspective on benthic sources of neodymium to the North Atlantic", lead PI 2022

NSF P2C2 Award: "Collaborative Research: Vertical gradients in Southern Ocean radiocarbon across the major climate transitions of the last 30 ka", Co-PI 2019

Lamont Postdoctoral Research Fellowship 2018
Caltech nominee for the Schmidt Science Fellowship 2017
NOSAMS Graduate Student Fellowship-Woods Hole Oceanographic Institute 2013

FIELD EXPERIENCE

D/V JOIDES Resolution—IODP Expedition 397 2022
R/V Atlantis—AT49 2022
D/V JOIDES Resolution—IODP Expedition 361 2016

INVITED SEMINARS

Departmental Colloquium, University of Southern California 2023
School of Earth and Climate Sciences Departmental Seminar, University of Maine 2022
US CLIVAR Task Team 5: Paleo AMOC Seminar 2021
Department Seminar, Max Planck Institute for Chemistry 2021
Ocean Circulation and Climate Dynamics Colloquium, GEOMAR 2021
Department of Marine Chemistry and Geochemistry, WHOI 2020
Department of Earth and Planetary Sciences Seminar, American Museum of Natural History 2020
Department of Atmospheric and Environmental Sciences Seminar, University at Albany 2020
Department of Earth and Planetary Science Seminar, UC Berkeley 2020
Department of Geosciences Seminar, Penn State University 2019
Environmental Geology & Geochemistry Seminar, Princeton University 2019
Geology and Geophysics seminar, WHOI 2018
Atmosphere, Ocean, and Climate Sack Lunch Seminar, MIT 2018

Guest seminar at University of Washington Department of Oceanography	2017
Lamont-Doherty Earth Observatory Geochemistry seminar	2016, 2017
UC Berkeley Isotope Geochemistry seminar	2017
University of Southern California Paleoenvironmental seminar	2016

CONFERENCE PRESENTATIONS

S. K. Hines, N. Lathika, M. Passacantando, A. Starr, C. D. Charles, S. L. Goldstein, S. R. Hemming, I. R. Hall, Changes in ocean circulation across the Mid-Pleistocene Transition from authigenic Nd and stable isotope measurements in the Cape Basin, Talk, PAGES QUIGS Workshop at Lamont-Doherty Earth Observatory, NY (2022).

S. K. Hines, N. Lathika, M. Passacantando, A. Starr, C. D. Charles, S. L. Goldstein, S. R. Hemming, I. R. Hall, Changes in ocean circulation across the Mid-Pleistocene Transition from authigenic Nd and stable isotope measurements in the Cape Basin, Poster, ICP14 conference in Bergen, Norway (2022).

S. K. Hines, S. Goldstein, C. Charles, I. Hall, S. Hemming, Glacial Overturning Circulation Structure in the Cape Basin from Neodymium Isotope Measurements.

- Talk presented at Ocean Sciences in San Diego, CA (2020)
- Invited talk presented at AGU Fall Meeting (2020)

Co-convener of Ocean Sciences session: Long-term Changes of the Deep Ocean Overturning Circulation: Past and Future (2020).

S. K. Hines, A. M. Franzese, C. Mwinde, S. Goldstein, C. Charles, I. Hall, S. Hemming, Glacial overturnin gcirculation structure and Agulhas Leakage from Nd isotope and K/Ar measurements in the Cape Basin, Poster, Goldschmidt Barcelona (2019).

S. K. Hines, A. F. Thompson, J. F. Adkins, The dynamics of abrupt transitions and hysteresis in glacial ocean circulation, Talk, Comer Climate Conference (2018). **S. K. Hines**, J. M. Eiler, J. F. Adkins, Intermediate water temperature and radiocarbon records from the North Atlantic and Southern Ocean across the most recent glacial termination, Talk, Goldschmidt (2017).

S. K. Hines, J. F. Adkins, A. F. Thompson, Insight into glacial interhemispheric ocean dynamics using a time-dependent box model with realistic ocean physics, Talk, NCAR Southern Ocean Workshop (2017).

S. K. Hines, A. F. Thompson, J. F. Adkins, Using a time-dependent dynamical box model to understand Intermediate Water records of radiocarbon and temperature, Poster, AGU Fall Meeting (2016).

S. K. Hines, J. M. Eiler, J. F. Adkins, A deep-sea coral clumped isotope and radiocarbon record from Southern Ocean intermediate water spanning the most recent glacial termination.

- Talk presented at AGU Fall Meeting in San Francisco, CA (2015)
- Poster presented at ICP12 conference in Utrecht, Netherlands (2016)

S. K. Hines, J. R. Southon, J. F. Adkins, Time series of radiocarbon in Southern Ocean intermediate water for the past 30,000 years.

- Poster presented at Goldschmidt in Sacramento, CA (2014)
- Talk presented at IPODS conference in Bern, Switzerland (2014)

TEACHING EXPERIENCE

Co-instructor for WHOI JP "Hot Topics" seminar (12.759)	2023
Guest lecture for WHOI JP Climate Change Science course (12.757)	2022
Guest lectures at Columbia in 'Introduction to Terrestrial Paleoclimate' and 'Southern Ocean Overturning Circulation'	2018

ADVISING EXPERIENCE

Co-mentor to Marie Curie Postdoctoral Fellow Anastasia Zhuravleva	2023–2025
Co-advisor to WHOI Undergraduate Summer Intern Josiah Hill (Hampton University)	2023
JP Chemical Oceanography first year co-advisor	2022–2023
Mentor to LDEO Undergraduate Summer Intern Mollie Passacantando (Rutgers)	2019

DIVERSITY, EQUITY AND INCLUSION EFFORTS

Co-chair of the WHOI Women's Committee	2023–present
Member of the WHOI Women's Committee	2022–present
Participant in the Unlearning Racism in Geoscience (URGE) course	2021
Participant and discussion leader for the Lamont Gender and Diversity Coffee Hour	2018–2020
Member of the Lamont Professional Conduct Committee	2018–2020

OUTREACH

American Museum of Natural History EarthFest exhibit with link to the JOIDES Resolution (2019)
Volunteer at the Intrepid Museum Kid's Week (2019)
Volunteer at Lamont-Doherty Earth Observatory Open House (2018)
Helped organize Caltech Division Geological and Planetary Sciences booth at the Los Angeles March for Science (2017)
Led tours for school groups through Caltech Center for Teaching, Learning and Outreach

- Linde-Robinson Building Coelostat tour for middle school group and high school Astronomy club (2017)
- Pi-day presentations on deep ocean and cave research for a group of third-graders and middle school girl scouts (2017)