Seung Hun Baek

Atmospheric, Earth and Energy Division Lawrence Livermore National Laboratory

APPOINTMENTS

Postdoctoral Researcher, Lawrence Livermore National Laboratory	2023-present
Climate Scientist – Physical Hazard Analysis, S&P Global Sustainable1	2022-2023
Postdoctoral Associate, Yale University (50% appointment 9/22-6/23)	2020-2023
Graduate Research Assistant, Columbia University	2015-2020

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EDUCATION

Ph.D., Earth & Environmental Sciences, Columbia University	2015-2020
B.A., Environmental Science, Columbia University	2010-2014

FELLOWSHIPS AND AWARDS

- Richard Foster Flint Postdoctoral Fellowship, Yale University (2020-2022)
- 1st Place (\$500), Expert Scored Poster Presentation, Yale Climate Day (2021)
- Nominee, Schmidt Science Fellows (2019)
- Honorable Mention, National Science Foundation Research Fellowship (2016)
- Dean's Fellow (5-yr full funding), Columbia University (2015-2020)

FUNDING AND GRANTS

2024-now	US Department of Energy Office of Science, A Framework for Improving Analysis
	and Modeling of Earth System and Intersectoral Dynamics at Regional Scales
	(supported personnel)
2024-2026	US Department of Energy Earthshots, Carbon Dioxide Removal and High-
	Performance Computing: Planetary Boundaries of Earth Shots
	(\$5.7 million; co-PI, \$58K to LLNL)
2020-2022	1 J
	(\$130K awarded on original proposal; extended one year)

INVITED TALKS

2025	Environmental Sciences Seminar, University of Virginia
2024	Environmental Studies and Sciences Seminar, Santa Clara University
2023	Current Research in Earth, Environmental and Planetary Sciences, Rice University
2023	Seminar, Department of Earth and Environmental Sciences, University of Texas-Arlington
2022	Seminar, Department of Earth and Environmental Sciences, University of Illinois Chicago
2021	Atmosphere Ocean Climate Dynamics Seminar, Yale University
2021	Departmental Seminar, Pohang University of Science and Technology
2020	Informal Seminar, Geophysical Fluid Dynamics Laboratory

CONFERENCE ORGANIZING

- Co-convener, Decision-relevant understanding of impactful weather and extremes session, AGU 2025 (upcoming).
- Co-convener, The atmospheric water cycle: processes, dynamics, isotopic tracers, and characteristics session, EGU 2024.

- 17. **S.H. Baek**, J.M. Lora, C.B. Skinner, M. Fu, J. Zhu (2025). Atmospheric and oceanic energetics during North Atlantic freshening events, *Climate Dynamics*, https://doi.org/10.1007/s00382-025-07761-1.
- 16. **S.H. Baek**, E.E. McClenny, P.A. Ullrich (2025). Response of atmospheric river width and intensity to aquaplanet warming: A detection algorithm- and background moisture-independent approach, *Journal of Geophysical Research Atmospheres*, https://doi.org/10.1029/2025JD043367.
- 15. **S.H. Baek**, P.A. Ullrich, B. Dong, J. Lee (2024). Evaluating downscaling with expected hydroclimatic co-variances, *Geoscientific Model Development*, https://doi.org/10.5194/gmd-17-8665-2024.
- 14. J.M. Lora, C.B. Skinner, W.D. Rush, **S.H. Baek** (2023). The hydrologic cycle and atmospheric rivers in CESM2 simulations of the Last Glacial Maximum, *Geophysical Research Letters*, https://doi.org/10.1029/2023GL104805
- 13. **S.H. Baek***, Y. Kanzaki*, J.M. Lora, N. Planavksy, C. Reinhard, S. Zhang (2023). Impact of climate on the global capacity for enhanced rock weathering on croplands, *Earth's Future*, https://doi.org/10.1029/2023EF003698 (*denotes equal contribution).
- 12. **S.H. Baek**, J.M. Battalio, J.M. Lora (2023). Atmospheric river variability over the last millennium driven by annular modes, *AGU Advances*, https://doi.org/10.1029/2022AV000834.
- 11. **S.H. Baek**, Y. Kushnir, M. Ting, J.E. Smerdon, J.M. Lora (2022). Regional Signatures of Forced North Atlantic SST Variability: A Limited Role for Aerosols and Greenhouse Gases, *Geophysical Research Letters*, https://doi.org/10.1029/2022GL097794.
- 10. Scholz, S.R., R. Seager, M. Ting, Y. Kushnir, J.E. Smerdon, B.I. Cook, E.R. Cook, S.H. Baek (2022). Changing hydroclimate dynamics and the 19th to 20th century wetting trend in the English Channel region of northwest Europe, *Climate Dynamics*, https://doi.org/10.1007/s00382-021-05977-5.
- 9. **S.H. Baek**, Y. Kushnir, W.A. Robinson, J.M. Lora, D.E. Lee, M. Ting (2021). An Atmospheric Bridge Between the Subpolar and Tropical Atlantic Regions: A Perplexing Asymmetric Teleconnection, *Geophysical Research Letters*, https://doi.org/10.1029/2021GL096602
- 8. **S.H. Baek** and J.M. Lora (2021). Counterbalancing influences of aerosols and greenhouse gases on atmospheric rivers, *Nature Climate Change*, https://doi.org/10.1038/s41558-021-01166-8.
- 7. **Baek, S.H.**, J.E. Smerdon, B.I. Cook, A.P. Williams (2021). US Pacific Coastal Droughts are Predominantly Driven by Internal Atmospheric Variability, *Journal of Climate*, https://doi.org/10.1175/JCLI-D-20-0365.1
- 6. **Baek, S.H.**, J.E. Smerdon, G. Dobrin, J.G. Naimark, E.R. Cook, B.I. Cook, R. Seager, M.A. Cane (2020). A quantitative hydroclimatic context for the European Great Famine of 1315-1317, *Communications Earth & Environment*, https://doi.org/10.1038/s43247-020-00016-3
- 5. Williams, A.P., E.R. Cook, J.E. Smerdon, B.I. Cook, J.T. Abatzoglou, K. Bolles, **S.H. Baek**, A. Badger, B. Livneh (2020). Large contribution from anthropogenic warming to a developing North American megadrought, *Science*, https://doi.org/10.1126/science.aaz9600
- 4. **Baek, S.H.**, N.J. Steiger, J.E. Smerdon, R. Seager (2019). Oceanic drivers of spatially widespread droughts in the contiguous US over the Common Era, *Geophysical Research Letters*, https://doi.org/10.1029/2019GL082838

PEER REVIEWED PUBLICATIONS (CONTINUED)

- 3. **Baek, S.H.**, J.E. Smerdon, R. Seager, A. P. Williams, B. I. Cook (2019). Pacific Ocean forcing and atmospheric variability are the dominant causes of spatially widespread droughts in the contiguous United States, *Journal of Geophysical Research Atmospheres*, https://doi.org/10.1029/2018JD029219.
- 2. PAGES Hydro2k Consortium (including **S.H. Baek**; 2017), Comparing proxy and model estimates of hydroclimate variability and change over the Common Era, *Climate of the Past*, https://doi.org/10.5194/cp-13-1851-2017.
- 1. **Baek, S.H.**, J.E. Smerdon, S. Coats, A. P. Williams, B.I. Cook, E.R. Cook, and R. Seager (2017), Precipitation, temperature, and teleconnection signals across the combined North American, Monsoon Asia, and Old World Drought Atlases, *Journal of Climate*, https://doi.org/10.1175/JCLI-D-16-0766.1

SELECT CONFERENCE PRESENTATIONS

- 2024 **Baek, S.H.**, P.A. Ullrich, B. Dong, J. Lee. Evaluating downscaling with expected hydroclimatic co-variances. (Oral). AGU Climate Downscaling and Weather Postprocessing: Development, Evaluation, and Applications II.
- 2023 **Baek, S.H.**, Y. Kanzaki, J.M. Lora, N. Planavksy, C. Reinhard, S. Zhang. Impact of climate on the global capacity for enhanced rock weathering on croplands (Poster). *AGU Fall Meeting 2023: Science-Based Gigaton-Scale Carbon Dioxide Removal (CDR): Strategies for Monitoring, Measurements, Reporting, and Verification (MMRV) II*
- Baek, S.H., J.M. Battalio, J.M. Lora. Atmospheric river variability over the last millennium driven by annular modes (Oral). *AGU Fall Meeting 2022: Atmospheric Rivers: Processes, Impacts, and Uncertainties*
- Baek, S.H., J.M. Battalio, J.M. Lora. Atmospheric river variability over the last millennium driven by annular modes (Oral). 4th International Atmospheric River Conference 2022
- 2022 **Baek, S.H.**, Y. Kushnir, W.A. Robinson, J.M. Lora, D.E. Lee, M. Ting. An Atmospheric Bridge Between the Subpolar and Tropical Atlantic Regions: A Perplexing Asymmetric Teleconnection. (Oral). *EGU General Assembly 2022: The North Atlantic: Natural Variability and Global Change*.
- 2022 **Baek, S.H.**, Y. Kushnir, W.A. Robinson, J.M. Lora, D.E. Lee, M. Ting. An Atmospheric Bridge Between the Subpolar and Tropical Atlantic Regions: A Perplexing Asymmetric Teleconnection. (Oral). *US AMOC Science Team Meeting*.
- 2022 **Baek, S.H.** and J.M. Lora. Counterbalancing Influences of Aerosols and GHGs on Atmospheric Rivers. (Oral). *American Meteorological Society: 35th Conference on Climate Variability and Change*.
- 2021 **Baek, S.H.** and J.M. Lora. Counterbalancing Influences of Aerosols and GHGs on Atmospheric Rivers. (Poster). *Yale Climate Day*.
- 2018 **Baek, S.H.**, N.J. Steiger, J.E. Smerdon. Parsing the dominant ocean influences on spatially widespread droughts in the contiguous US over the Common Era (Oral). *AGU Fall Meeting 2018: Climate of the Common Era*.
- 2017 Baek, S.H., J.E. Smerdon, S. Coats, A.P. Williams, B.I. Cook, E.R. Cook, R. Seager. Precipitation, temperature, and teleconnection signals across the combined North American, Monsoon Asia, and Old World Drought Atlases (Poster). PAGES OSM Open Science Meeting: Large-scale hydroclimate variability and change of the Common Era: Patterns, Impacts, and Processes.

TEACHING EXPERIENCE

2024 Spring Guest Lecturer, ECS0003 Introduction to Climate Science

Teaching Assistant, UN2200 Earth Environmental System: Earth System 2019 Fall Teaching Assistant, UN2310 Earth Environmental System: Life System 2017 Spring Teaching Assistant, W4008 Introduction to Atmospheric Science 2016 Fall

JOURNAL REFEREEING

- Proceedings of the National Academy of Sciences
- Journal of Climate
- Geophysical Research Letters
- Journal of Geophysical Research Atmospheres
- Journal of Hydrology: Regional Studies