# Seung Hun Baek

Nationality: USA

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## APPOINTMENTS

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|---|---|
| *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 |

## EDUCATION

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|---|---|
| *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 | Richard Foster Flint Postdoctoral Fellowship of Yale University ($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.

## PEER REVIEWED PUBLICATIONS

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 19$^{th}$ to 20$^{th}$ 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*

2022 **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*

2022 **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

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| 2024 Spring | *Guest Lecturer*, ECS0003 Introduction to Climate Science |
| 2019 Fall | *Teaching Assistant,* UN2200 Earth Environmental System: Earth System |
| 2017 Spring | *Teaching Assistant*, UN2310 Earth Environmental System: Life System |
| 2016 Fall | *Teaching Assistant,* W4008 Introduction to Atmospheric Science |

## 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*