Benjamin R. Hillman

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Education

Ph.D., Atmospheric Sciences, University of Washington, Seattle, WA, June 2016
M.S., Atmospheric Sciences, University of Washington, Seattle, WA, 2012
B.S., Physics and Mathematics *Cum Laude*, Western Washington University, Bellingham, WA, 2008
A.S., Shoreline Community College, Seattle, WA, 2005

Research Experience

R&D S&E Geosciences Engineering, Department of Atmospheric Science, Sandia National Laboratories, Albuquerque, NM, Spring 2017-Present

- Implementation and analysis of radiative transfer codes in the Super-Parameterized Energy Exascale Earth System Model.
- Development of regionally-refined meshes for high resolution simulations with the Energy Exascale Earth System Model.
- Improving understanding of Arctic cloud processes and model biases through high resolution atmospheric modeling and observations.

Postdoctoral Appointee, Department of Atmospheric Science, Sandia National Laboratories, Albuquerque, NM, Summer 2016-Spring 2017

- Improving understanding of Arctic cloud processes and model biases through high resolution atmospheric modeling and observations.
- Development and analysis of cutting-edge techniques for improved simulation in global climate models, including the use and development of super-parameterization and regionally-fined meshes.

Graduate Research Associate, Department of Atmospheric Sciences, University of Washington, Seattle, WA, Fall 2008–Spring 2016

- Evaluating cloud properties in atmospheric models against satellite remote sensing retrievals using satellite instrument simulators to account for limitations and uncertainties in retrievals.
- Quantification of uncertainties and inherent biases in the satellite simulator framework due to representations of unresolved scales.
- Development and implementation of an improved parameterization of unresolved cloud properties for use in satellite simulators.

Research Associate, Department of Chemistry, Western Washington University, Bellingham, WA, Summer 2008

- Modeling growth of thin semiconductor films using a deposition, diffusion, aggregation model.

Technical Skills

- Development and analysis of a range of global climate models, including the GFDL global atmosphere model (AM2), the NCAR Community Earth System Model (CESM), the Super-Parameterized Community Atmosphere Model (SP-CAM), the Energy Exascale Earth System Model (E3SM), and the Super-Parameterized Energy Exascale Earth System Model (SP-E3SM)
- Implementation and analysis of radiation codes in earth system models
- Expertise in the use of satellite instrument simulators for model evaluation
- Development of analysis tools for end-user applications, including incorporation of new diagnostics into the NCAR Atmosphere Model Working Group (AMWG) diagnostics package
- Experience with a range of programming and analysis languages including Fortran (77, 90, and 2003), C, Python, Matlab, NCL, and UNIX shell scripting
- Analysis of geospatial datasets using the netCDF operators (NCO)
- Using git and github for software version control and project management
- Working in high-performance computing environments

Teaching Experience

Teaching Assistant, Atmospheric Radiative Transfer (ATM S 341), University of Washington, Seattle, WA, Spring 2014

Teaching Assistant, Introduction to Weather (ATM S 101), University of Washington, Seattle, WA, Winter 2010

Teaching Assistant, Department of Physics and Astronomy, Western Washington University, Bellingham, WA, Winter 2006–Spring 2008

Field Experience

Storm Peak Lab Cloud Property Validation Experiment (STORMVEx) Steamboat Springs, CO, Winter 2011

Honors

2011 NCAR Advanced Study Program Graduate Visitor
2008 Dr. James and Joann Albers memorial scholarship
2007 Dr. James and Joann Albers memorial scholarship

Recent Publications

Hillman, B. R., R. T. Marchand, T. P. Ackerman (2018), Sensitivities of simulated satellite views of clouds to subgrid-scale overlap and condensate heterogeneity. Journal of Geophysical Research: Atmospheres, 123, https://doi.org/10.1029/2017JD027680.

Hillman, B. R., R. T. Marchand, T. P. Ackerman, G. G. Mace, and S. Benson (2017), Assessing the accuracy of MISR and MISR-simulated cloud top heights using CloudSat- and CALIPSO-retrieved hydrometeor profiles, Journal of Geophysical Research: Atmospheres, 122, doi:10.1002/2016JD025510.

Hillman, B. R. (2016), Reducing errors in simulated satellite views of clouds from large-scale models. Ph.D. dissertation, University of Washington uri:http://hdl.handle.net/1773/36492.

Hillman, B. R., (2012), Evaluating clouds in global climate models using instrument simulators. M.S. thesis, University of Washington.

Kay, J. E., B. R. Hillman, S. A. Klein, Y. Zhang, B. Medeiros, R. Pincus, A. Gettelman, B. Eaton, J. Boyle, R. Marchand, and T. P. Ackerman (2012), Exposing global cloud biases in the Community Atmosphere Model (CAM) using satellite observations and their corresponding instrument simulators, J. Climate, 25, 5190–5207, doi:10.1175/JCLI-D-11-00469.1.

Selected Presentations

Hillman, B. R., E. L. Roesler, and D. Dexheimer, 2018: Multi-scale Modeling and Measurements of Arctic Clouds. SCAR/IASC Open Science Conference, Davos, Switzerland.

Hillman, B. R., R. T. Marchand, and T. P. Ackerman, 2016: Reducing errors in satellite-simulated views of clouds with an improved parameterization of unresolved scales. American Geophysical Union Fall Meeting, San Francisco, CA.

Hillman, B. R., R. Marchand, T. P. Ackerman, 2014: Comparison of MISR and MISR-simulated cloud top heights using CloudSat and CALIPSO profiles. MISR Science Team Meeting, Pasadena, CA.

Hillman, B. R., R. Marchand, T. P. Ackerman, A. Bodas-Salcedo, J. Cole, J.-C. Golaz, J. E. Kay, 2012: Comparing cloud biases in CMIP5: insights using MISR and ISCCP American Geophysical Union Fall Meeting, San Francisco, CA.

Hillman, B. R., R. Marchand, T. P. Ackerman, A. Bodas-Salcedo, J. Cole, J.-C. Golaz, J. E. Kay, 2012: An intercomparison of clouds and radiation in CMIP5 models using MISR and ISCCP simulators. 1st Pan-Global Atmosphere Systems Studies (GASS) Conference, Boulder, CO.

Hillman, B. R., J. E. Kay, S. A. Klein, Y. Zhang, B. Medeiros, R. Pincus, A. Gettelman, B. Eaton, J. Boyle, R. Marchand, and T. P. Ackerman, 2011: Evaluating clouds in climate models using satellite simulators: from mean state to feedbacks. American Geophysical Union Fall Meeting, San Francisco, CA.

Hillman, B., J. Kay, and T. Ackerman, 2011: Evaluating clouds in the Community Atmosphere Model using COSP. Poster presentation, CESM Annual Workshop, Breckenridge, CO.

Hillman, B., R. Marchand, and T. Ackerman, 2010: Evaluation of Clouds in Climate Models Using Instrument Simulators. Western Washington University Physics Department Invited Colloquium, Bellingham, WA.

Hillman, B., R. Marchand, and T. Ackerman, 2010: Evaluation of Low Clouds in the NCAR CAM3 and GFDL AM2 Using MISR Joint Histograms. American Geophysical Union Fall Meeting, San Francisco, CA.