

Dr. R. Bradley Pierce

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Education:

PhD, Meteorology, University of Wisconsin-Madison, 1988
BS, Physics, University of Wisconsin-River Falls, 1982
BS, Mathematics, University of Wisconsin-River Falls, 1982

Work History

05/07-Present	Physical Scientist, Advanced Satellite Products Branch, NOAA/NESDIS Center for Satellite Applications and Research, Cooperative Institute for Meteorological Satellite Studies, Madison, WI
12/89-04/07	Research Scientist, Atmospheric Science Division, NASA Langley Research Center, Hampton VA

Professional Experience

Dr. Pierce has more than 15 years of experience in the design, development and execution of global atmospheric models. Dr. Pierce is the Principal Investigator of RAQMS (Real-time Air Quality Modeling System). RAQMS is a global meteorological and chemical modeling system for assimilating satellite observations of atmospheric chemical composition and aerosol optical properties and predicting the global distribution of atmospheric trace gases and aerosols.

Dr. Pierce has used RAQMS to provide chemical and aerosol assimilation and forecasting support for numerous NASA and NOAA field campaigns. During the 2008 NOAA Aerosol, Radiation, and Cloud Processes affecting Arctic Climate (ARCPAC) field mission, RAQMS forecasts were constrained with real-time ozone retrievals from the Microwave Limb Sounder (MLS) and Ozone Monitoring Instrument (OMI) and aerosol optical depth (AOD) retrievals from the Moderate Resolution Imaging Spectroradiometer (MODIS). During the 2006 NOAA Texas Air Quality Study (TEXAQS) field mission, he led an effort using RAQMS chemical analyses (constrained with OMI and TES ozone retrievals) combined with Lagrangian trajectory analysis to provide estimates of the influence of background ozone production on Houston and Dallas air quality.

Dr. Pierce is a member of the Air Quality/Aerosols and Aviation Application Teams within the GOES-R Algorithm Working Group (AWG). His responsibilities within the GOES-R AWG include generation of high resolution proxy data sets for GOES-R retrieval development using coupled RAQMS/WRF-CHEM chemical and aerosol simulations and the NOAA Community Radiative Transfer Model (CRTM), conducting prototype chemical and aerosol data assimilation studies (OSEs) for NWS risk mitigation, and development of GOES-R visibility retrievals.

Dr Pierce has been actively involved in the NASA Applied Sciences Program, which focuses on transitioning NASA satellite data sets to other agencies Decision Support Systems. In 2003, he led a team of NASA, NOAA, and EPA researchers who demonstrated a prototype (Infusing satellite Data into Environmental Applications, or IDEA) for using satellite constituent observations in daily EPA air quality forecasts. In 2005, Dr Pierce led an effort to use RAQMS chemical analyses to benchmark the impact of large-scale chemical boundary conditions on the USEPA's Community Multi-scale Air Quality (CMAQ) model.

Publications:

1. **Pierce, R. B.**, J. Al-Saadi, C. Kittaka, T. Schaack, A. Lenzen, K. Bowman, J. Szykman, A. Soja, T. Ryerson, A. M. Thompson, P. Bhartia, G. A. Morris, Impacts of background ozone production on Houston and Dallas, TX Air Quality during the TexAQS field mission, Accepted to JGR, February, 2009
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3. Verma S., John Worden, **Brad Pierce**, Dylan B. A. Jones, Jassim Al-Saadi, Folkert Boersma, Kevin Bowman, Annmarie Eldering, Brendan Fisher, Line Jourdain, Susan Kulawik, Helen Worden (2009), Ozone production in boreal fire smoke plumes using observations from the Tropospheric Emission Spectrometer and the Ozone Monitoring Instrument, J. Geophys. Res., 114, D02303, doi:10.1029/2008JD010108.
4. Al-Saadi, J. A., A. Soja, **R. B. Pierce**, J. J. Szykman, C. Wiedinmyer, L. Emmons, S. Kondragunta, X. Zhang, C. Kittaka, T. Schaack, K. Bowman, Evaluation of Near-Real-Time Biomass Burning Emissions Estimates Constrained by Satellite Active Fire Detections, Journal of Applied Remote Sensing, January 2008
5. Youhua Tang, Pius Lee, Marina Tsidulko, Ho-Chun Huang, Jeffery T. McQueen, Geoffrey J. DiMego, Louisa K. Emmons, **Robert B. Pierce**, Anne M. Thompson, Hsin-Mu Lin, Daiwen Kang, Daniel Tong, Shaocai Yu, Rohit Mathur, Jonathan E. Pleim, Tanya L. Otte, George Pouliot, Jeffrey O. Young, Kenneth L. Schere, Paula M. Davidson and Ivanka Stajner (2008), The impact of chemical lateral boundary conditions on CMAQ predictions of tropospheric ozone over the continental United States, Environmental Fluid Mechanics, DOI: 0.1007/s10652-008-9092-5
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8. Fishman, J., K. W. Bowman, J. P. Burrows, A. Richter, K. V. Chance, D. P. Edwards, R. V. Martin, G. A. Morris, **R. B. Pierce**, J. R. Ziemke, J. A. Al-Saadi, T. K. Schaack, A. M. Thompson, Remote Sensing of Chemically Reactive Tropospheric Trace Gases from Space, BAMS, Vol 89, no 6, pages 805-821, June 2008. (Cover Article)
9. Song, C.-K., D. W. Byun, R. B. Pierce, J. A. Al-Saadi, T. K. Schaack, and F. Vukovich (2008), Downscale linkage of global model output for regional chemical transport modeling: Method and general performance, J. Geophys. Res., 113, D08308, doi:10.1029/2007JD008951.
10. Kongragunta, S., P. Lee, J. McQueen, C. Kittaka, A. Prados, P. Ciren, I. Laszlo, **R. B. Pierce**, R. Hoff, J. Szykman, (2008), Air Quality Forecast Verification using Satellite Data, Journal of Applied Meteorology and Climatology, Vol. 47, No. 2., pages 425–442.
11. **Pierce, R. B.**, T. K. Schaack, J. Al-Saadi, T. D. Fairlie, C. Kittaka, G. Lingenfelser, M. Natarajan, J. Olson, A. Soja, T. H. Zapotocny, A. Lenzen, J. Stobie, D. R. Johnson, M. Avery, G. Sachse, A. Thompson, R. Cohen, J. Dibb, J. Crawford, D. Rault, R. Martin, J. Szykman, J.

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 13. Fairlie T. D., M. A. Avery, **R. B. Pierce**, J. Al-Saadi, J. Dibb, G. Sachse (2007), Impact of multiscale dynamical processes and mixing on the chemical composition of the upper troposphere and lower stratosphere during the Intercontinental Chemical Transport Experiment–North America, *J. Geophys. Res.*, 112, D16S90, doi:10.1029/2006JD007923.
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 15. Singh, H. B., L. Salas, D. Herlth, R. Kolyer, E. Czech, M. Avery, J. H. Crawford, **R. B. Pierce**, G. W. Sachse, D. R. Blake, R. C. Cohen, T. H. Bertram, A. Perring, P. J. Wooldridge, J. Dibb, G. Huey, R. C. Hudman, S. Turquety, L. K. Emmons, F. Flocke, Y. Tang, G. R. Carmichael, L. W. Horowitz, (2007), Reactive nitrogen distribution and partitioning in the North American troposphere and lowermost stratosphere, *J. Geophys. Res.*, 112, D12S04, doi:10.1029/2006JD007664.
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 21. Al-Saadi, JA, **Pierce, RB**, Natarajan, M, Fairlie, TD, Grose, WL, Chemical climatology of the middle atmosphere simulated by the NASA Langley Research Center Interactive Modeling Project for Atmospheric Chemistry and Transport (IMPACT) model, *J. Geophys. Res.*, 109, D17301, 2004

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