

CURRICULUM VITAE - Robert Wood

Professor

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Education:

B.A. University of Cambridge, UK, 1989-1992
Natural Sciences (Physics and Theoretical Physics)

Ph.D. University of Manchester Institute of Science and Technology, UK, 1993-1997
Atmospheric Physics, Title: *Aircraft Observations of Boundary Layer Structure*, Advisor
Peter R Jonas

Professional Experience

Department of Atmospheric Sciences, University of Washington, Seattle (2014-present):

Professor: Responsible for the development of a program of research centered on the understanding of cloud physical processes, and teaching in the undergraduate and graduate program.

Department of Atmospheric Sciences, University of Washington, Seattle (2010-present):

Associate Professor: Responsible for the development of a program of research centered on the understanding of cloud physical processes, and teaching in the undergraduate and graduate program.

Department of Atmospheric Sciences, University of Washington, Seattle (2006-2010):

Assistant Professor: Responsible for the development of a program of research centered on the understanding of cloud physical processes, and teaching in the undergraduate and graduate program.

Department of Atmospheric Sciences, University of Washington, Seattle (2004-2006):

Research Assistant Professor: Responsible for the development of a program of research centered on the understanding of cloud physical processes.

Department of Atmospheric Sciences, University of Washington, Seattle (2001-2003):

Research Associate: Studied boundary layer cloud structure, variability, and microphysical processes.

Meteorological Research Flight, UK Met Office (1997-2001):

Research Scientist: Research related to boundary layer cloud microphysical processes and structural properties. Responsibilities included the planning and executing of aircraft-based field programs.

Honors

- The 2001 L. F. Richardson Prize, Royal Meteorological Society.
- Editors' Citation for Excellence in Refereeing for *Journal of Geophysical Research – Atmospheres*, 2007.
- University of Washington Department of Atmospheric Sciences Teaching Award
- The 2011 Henry G Houghton Award, American Meteorological Society, "For advancing understanding of the interactions between cloud droplets, aerosols, radiation and precipitation in marine stratocumulus."

Professional Activities

- Editor, *Journal of Climate* (2009-present)
- Reviewer for *Journal of the Atmospheric Sciences*, *Quarterly Journal of the Royal Meteorological Society*, *Journal of Climate*, *Journal of Geophysical Research*, *Atmospheric Research*, *Atmospheric Chemistry and Physics*, *Journal of Applied Meteorology*, *Journal of Atmospheric and Oceanic*

Technology, Atmospheric Chemistry and Physics, Transactions on Geoscience and Remote Sensing, Journal of Computational Physics, Geophysical Remote Sensing Letters, Nature.

- Member of American Meteorological Society, Royal Meteorological Society, American Geophysical Union
- American Meteorological Society STAC Atmospheric Radiation committee member
- VAMOS Ocean-Cloud-Atmosphere-Land Study (VOCALS) Scientific Working Group member
- Principal Investigator - VOCALS-Regional Experiment (VOCALS-REx), Chile, Oct/Nov 2008.
- Principal Investigator – ARM Mobile Facility Deployment - Clouds, Aerosols and Precipitation (CAP-MBL), Azores (March-December 2009)
- International CLIVAR Variability of the American Monsoon Systems (VAMOS) Panel Member, 2012-2013
- iLeaps/IGAC Aerosols, Clouds, Precipitation and Climate (ACPC) Initiative working group member, 2011-present
- Member, International Commission on Clouds and Precipitation (ICCP), 2012-present.
- Chairperson, Gordon Conference on Radiation and Climate, 2011.
- NASA CloudSat/CALIPSO Mission Science Team Member.
- Physics of Stratocumulus Top (POST) Science Team Member.
- Member, Cloud-Aerosol-Precipitation Interactions (CAPI) Working Group of the DoE Atmospheric Systems Research (ASR) Program, Nov 2009-present.
- Chair, Cloud-Aerosol-Precipitation Interactions (CAPI) Working Group of the DoE Atmospheric Systems Research (ASR) Program, Aug 2013-present.
- Member, Science and Infrastructure Steering Committee of the DoE Atmospheric Systems Research (ASR) Program, Aug 2013-present.
- Member, ARM Science Board, April 2014-present.
- US Climate Variability and Predictability Research Program (CLIVAR) Scientific Steering Committee, Member, 2011-present
- Member, US CLIVAR Process Study Model Improvement Panel (PSMIP), 2010-2013.
- CoChair, US CLIVAR Process Study Model Improvement Panel (PSMIP), 2011-2013.
- Study Co-lead, Keck Institute for Space Studies (KISS): Innovative Satellite Observations to Characterize the Cloudy Boundary Layer, 2010-present.

Peer-reviewed Publications

[H-index 32 from 90 publications, 2636 citations with mean of 29.0 citations per paper]

- [1] Wood, R., I. M. Stromberg, P. R. Jonas and C. S. Mill, 1997: Analysis of an air motion system on a light aircraft for boundary layer research. *J. Atmos. Oceanic Technol.*, **14**, 960-968.
- [2] Wood, R., D. W. Johnson and S. R. Osborne, 1998: The effect of drizzle on the redistribution of aerosol in the boundary layer: estimation of the scale of the effect during ACE-2 using aircraft data. *J. Aerosol Sci.*, **29**, Supp 1, 1097-1098.
- [3] Wood, R., I. M. Stromberg and P. R. Jonas, 1999: Aircraft observations of sea breeze frontal structure. *Quart. J. Roy. Meteor. Soc.*, **125**, 1959-1996.
- [4] Wood, R. and P. R. Field, 2000: Relationships between total water, condensed water and cloud fraction in stratiform clouds examined using aircraft data. *J. Atmos. Sci.*, **57**, 1888-1905.
- [5] Wood, R., D. W. Johnson, S. R. Osborne, M.O. Andreae, B. Bandy, T. S. Bates, C. O'Dowd, P. Glantz, K. Noone, P. K. Quinn, J. Rudolph, K. Suhre, 2000: Boundary layer and aerosol evolution during the third Lagrangian experiment of ACE-2. *Tellus*, **52B**, 401-422.
- [6] Osborne, S. R., D. W. Johnson, R. Wood, B. Bandy, M. O. Andreae, C. O'Dowd, P. Glantz, K. Noone, J. Rudolph, T. S. Bates P. K. Quinn, 2000: Evolution of the aerosol, cloud and boundary layer dynamic and thermodynamic characteristics during the second lagrangian experiment of ACE-2. *Tellus*, **52B**, 375-400.

- [7] Johnson D. W., S. R. Osborne, R. Wood, B. Bandy, M. O. Andreae, C. O'Dowd, P. Glantz, K. Noone, J. Rudolph, T. S. Bates P. K. Quinn, 2000: Observations of the evolution of the aerosol, cloud and boundary layer characteristics during the first Lagrangian experiment of ACE-2. *Tellus*, **52B**, 348-374.
- [8] Johnson D. W., S. R. Osborne, R. Wood, B. Bandy, M. O. Andreae, C. O'Dowd, P. Glantz, K. Noone, J. Rudolph, T. S. Bates P. K. Quinn, 2000: An overview of the Lagrangian experiments undertaken during the second Aerosol Characterisation Experiment. *Tellus*, **52B**, 290-320.
- [9] Solazzo. M., L. M. Russell, D. Percival, S. R. Osborne, R. Wood and D. Johnson, 2000: Entrainment rates during ACE-2 Lagrangian experiments calculated from aircraft measurements. *Tellus*, **52B**, 335-347.
- [10] Andreae, M. O., W. Elbert, R. Gabriel, D. W. Johnson, S. R. Osborne R. Wood, 2000: Soluble ion chemistry of the atmospheric aerosol and SO₂ concentrations over the eastern North Atlantic during ACE-2. *Tellus*, **52B**, 1066-1087.
- [11] Ghosh, S., P. R. Jonas and R. Wood, 2000: Large eddy simulations and aircraft observations of two cases of stratocumulus cloud. *Quart. J. Roy. Meteor. Soc.*, **126**, 2851-2872.
- [12] Wood. R, 2000: Parametrization of the effect of drizzle upon the droplet effective radius in stratocumulus clouds. *Quart. J. Roy. Meteorol. Soc.*, **126**, 3309-3325.
- [13] Suhre, K., D. W. Johnson, R. Rosset, S. R. Osborne, R. Wood, T. S. Bates, F. Raes, 2000: A continental outbreak of air that occurred during the Second Aerosol Characterization Experiment (ACE 2): A Lagrangian experiment. *J. Geophys. Res.*, **105**, 17911-17924.
- [14] Suhre, K., V. Crassier, C. Mari, R. Rosset, D. W. Johnson, S. R. Osborne, R. Wood, M. O. Andreae, B. Bandy, T. S. Bates, S. Businger, C. Gerbig, F. Raes and J. Rudolph, 2000, Chemistry and aerosols in the marine boundary layer: 1-D modelling of three ACE-2 Lagrangian experiments. *Atmos. Environ.*, **34**, 5079-5094.
- [15] Osborne, S. R., D. W. Johnson, K. N. Bower, R. Wood, 2001: Modification of the aerosol size distribution within exhaust plumes produced by diesel-powered ships. *J. Geophys. Res.*, **106**, 9827-9842.
- [16] Larson, V. E., R. Wood, P. R. Field, J.-C. Golaz, T. H. Vonder Haar, W. R. Cotton, 2001: Systematic biases in the microphysics and thermodynamics of numerical models that ignore subgrid-scale variability. *J. Atmos. Sci.*, **58**, 1117-1128.
- [17] Larson, V. E., R. Wood, P. R. Field, J.-C. Golaz, T. H. Vonder Haar, W. R. Cotton, 2001: Small-scale and mesoscale variability of scalars in cloudy boundary layers: One dimensional probability density functions. *J. Atmos. Sci.*, **58**, 1978-1994.
- [18] Wood, R. and J. P. Taylor, 2001: Liquid water path variability in unbroken marine stratocumulus cloud. *Quart. J. Roy. Meteorol. Soc.*, **127**, 2635-2662.
- [19] Wood, R., S. Irons, and P. R. Jonas, 2002: How important is the spectral ripening effect in stratiform boundary layer clouds? Studies using simple trajectory analysis. *J. Atmos. Sci.*, **59**, 2681-2693.
- [20] Price, J. D., and R. Wood, 2002: Comparison of probability density functions for total specific humidity and saturation deficit humidity, and consequences for cloud parameterization. *Quart. J. Roy. Meteorol. Soc.*, **128**, 2059-2072.
- [21] Wood, R., P. R. Field, and W. R. Cotton, 2002: Autoconversion rate bias in stratiform boundary layer cloud parameterizations. *Atmos. Res.*, **65**, 109-128.
- [22] Wood, R., C. S. Bretherton, and D. L. Hartmann, 2002: Diurnal cycle of liquid water path over the subtropical and tropical oceans. *Geophys. Res. Lett.* 10.1029/2002GL015371.
- [23] Field, P. R., R. Wood, E. Hirst, R. Greenaway, P. Kaye, P. R. A. Brown, and J. A. J. Smith, 2003: Ice particle interarrival times measured with a fast FSSP. *J. Atmos. Oceanic Technol.*, **20**, 249- 261, 2003.
- [24] Bretherton, C. S., T. Uttal, C. W. Fairall, S. E. Yuter, R. A. Weller, D. Baumgardner, K. Comstock, R. Wood, and G. B. Raga, 2004: The EPIC 2001 Stratocumulus Study, *Bull. Am. Meteorol. Soc.*, **85**, 967-977.

- [25] Wood, R., and Bretherton, C.S., 2004: Boundary layer depth, entrainment and decoupling in the cloud-capped subtropical and tropical marine boundary layer. *J. Clim.*, **17**, 3576-3588.
- [26] Comstock, K. K., R. Wood, S. E. Yuter, and C. S. Bretherton, 2004: Reflectivity and rain rate in and below drizzling stratocumulus. *Quart. J. Roy. Meteor. Soc.*, **128**, 2891-2918.
- [27] Stevens, B., G. Vali, K. Comstock, R. Wood, M. VanZanten, P.H. Austin, C.S. Bretherton, D.H. Lenschow, 2005: Pockets of Open Cells (POCs) and drizzle in marine stratocumulus, *Bull. Am. Meteorol. Soc.*, **86**, 51-57.
- [28] Wood, R., 2005: Drizzle in stratocumulus. Part I: Horizontal and vertical structure. *J. Atmos. Sci.*, **62**, 3011-3034.
- [29] Wood, R., 2005: Drizzle in stratocumulus. Part II: Microphysical Aspects. *J. Atmos. Sci.*, **62**, 3035-3050.
- [30] Wood, R., and P. Blossey, 2005: Comments on: "On the parameterization of the autoconversion process. Part I: Analytical formulation of the Kessler-type parameterizations". *J. Atmos. Sci.*, **62**, 3003-3006.
- [31] Caldwell, P., C. S. Bretherton, and R. Wood, 2005: Mixed layer budget analysis of stratocumulus dynamics during EPIC. *J. Atmos. Sci.*, **62**, 3775-3791.
- [32] Liu, Y., Daum, P. H., McGraw, R., and Wood, R., 2006: Parameterization of the autoconversion process. Part II: Generalization of the Sundqvist-type parameterizations. *J. Atmos. Sci.*, **63**, 1103-1109.
- [33] Wood, R., and D. L. Hartmann, 2006: Spatial variability of liquid water path in marine low cloud: The importance of mesoscale cellular convection. *J. Clim.*, **19**, 1748-1764.
- [34] Rasch, P. J., Stevens, M. J., Ricciardulli, L., Dai, A., Negri, A., Wood, R., Boville, B. A., Eaton, B., and Hack, J. J., 2006: A characterization of tropical transient activity in the CAM3 atmospheric hydrologic cycle., *J. Clim.*, **19**, 2222-2242.
- [35] Wood, R., and C. S. Bretherton, 2006: On the relationship between stratiform low cloud cover and lower tropospheric stability., *J. Clim.*, **19**, 6425-6432.
- [36] Wood, R., 2006: The rate of loss of cloud condensation nuclei by coalescence in warm clouds. *J. Geophys. Res.*, **111**, D21205, doi:10.1029/2006JD007553.
- [37] Field, P. R. and R. Wood, 2007: Precipitation and cloud structure in midlatitude cyclones. *J. Clim.*, **20**, 233-254.
- [38] Wood, R., 2007: Cancellation of aerosol indirect effects in marine stratocumulus through cloud thinning. *J. Atmos. Sci.*, **64**, 2657-2669.
- [39] Kubar, T. L., D. L. Hartmann, and R. Wood, 2007: Radiative and convective driving of tropical high clouds. *J. Clim.*, **20**, 5510-5526.
- [40] Comstock, K. K., S. E. Yuter, R. Wood, and C. S. Bretherton, 2007: The three dimensional structure and kinematics of drizzling stratocumulus. *Mon. Wea. Rev.*, **135**, 3767-3784.
- [41] Field, P. R. and R. Wood, 2007: Corrigendum to Precipitation and cloud structure in midlatitude cyclones. *J. Clim.*, **20**, 5208-5210.
- [42] Yuan, J., D. L. Hartmann, and R. Wood, 2007: Dynamic effects on tropical mean cloud radiative forcing and radiation budget. *J. Clim.*, **21**, 2337-2351, 2008.
- [43] Chen, R., R. Wood, Z. Li, R. Ferraro, and F-L Chang, 2008: Studying the vertical variation of cloud droplet effective radius using ship and spaceborne remote sensing data. *J. Geophys. Res.*, **113**, D00A02, doi:10.1029/2007JD009596.
- [44] Chand, D., T. L. Anderson, R. Wood, R. J. Charlson, Y. Hu, Z. Liu, M. Vaughan, 2008: Quantifying above-cloud aerosol using spaceborne lidar for improved understanding of cloudy-sky direct climate forcing. *J. Geophys. Res.*, **113**, D13206, doi:10.1029/2007JD009433.
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- [46] Field, P. R., A. Gettelman, R. Neale, R. Wood, P. J. Rasch and H. Morrison, 2008: Midlatitude cyclone compositing to constrain climate model behavior using satellite observations. *J. Clim.*, **21**, 5887-5903
- [47] Kay, J. E., and R. Wood, 2008: Timescale analysis of aerosol sensitivity during homogeneous freezing and implications for upper tropospheric water vapor budgets. *Geophys. Res. Lett.*, **35**, L10809, doi:10.1029/2007GL032628.
- [48] Brenguier, J.-L. and R. Wood, 2009: Observational strategies from the micro to meso scale. In the Strüngmann Forum Report, *Clouds in the Perturbed Climate System: Their Relationship to Energy Balance, Atmospheric Dynamics, and Precipitation*. Edited by Jost Heintzenberg and Robert J. Charlson. MIT Press ISBN 978-0-262-01287-4.
- [49] Quaas, J. (Rapporteur), S. Bony, W. D. Collins, L. Donner, A. Illingworth, A. Jones, U. Lohmann, M. Satoh, S. E. Schwartz, W.-K. Tao, and R. Wood, 2009: Current understanding and quantification of clouds in the changing climate system and strategies for reducing critical uncertainties. In the Strüngmann Forum Report, *Clouds in the Perturbed Climate System: Their Relationship to Energy Balance, Atmospheric Dynamics, and Precipitation*. Edited by Jost Heintzenberg and Robert J. Charlson. MIT Press ISBN 978-0-262-01287-4
- [50] Chand, D., R. Wood, T. Anderson, S. K. Satheesh, and R. J. Charlson, 2009: Satellite-derived direct radiative effect of aerosols dependent on cloud cover. *Nature Geoscience*, **2**, 181-184.
- [51] Lopez, M. A., D. L. Hartmann, P. N. Blossey, R. Wood, C. S. Bretherton, and T. L. Kubar, 2009: A test of the simulation of tropical convective cloudiness by a cloud-resolving model. *J. Clim.*, **22**, 2834-2849.
- [52] Kubar, T., D. L. Hartmann, and R. Wood, 2009: Understanding the importance of microphysics and macrophysics for warm rain in marine low clouds: Part I. Satellite observations. *J. Atmos. Sci.*, **66**, 2953-2972
- [53] Wood, R., T. Kubar, and D. L. Hartmann. Understanding the importance of microphysics and macrophysics for warm rain in marine low clouds: Part II. Heuristic models of rain formation. *J. Atmos. Sci.*, **66**, 2973-2990.
- [54] Wood, R. M. Kohler, R. Bennartz, C. O'Dell, 2009: The diurnal cycle of surface divergence over the global oceans. *Quart. J. Roy. Meteorol. Soc.*, **135**, 1484-1493.
- [55] Wyant, M. C., R. Wood, C.S. Bretherton, C. R. Mechoso, J. Bacmeister, M. A. Balmaseda, B. Barrett, F. Codron, P. Earnshaw, J. Fast, A. Hall, C. Hannay, J. W. Kaiser, H. Kitagawa, S. A. Klein, M. Koehler, J. Manganello, H.-L. Pan, S. Wang, and Y. Wang, 2010: The PreVOCA Experiment: Modeling the lower troposphere in the Southeast Pacific. *Atmos. Chem. Phys.*, **10**, 4757-4774, doi:10.5194/acp-10-4757-2010.
- [56] George, R.C., and R. Wood, 2010: Subseasonal variability of low cloud radiative properties over the southeast Pacific Ocean. *Atmos. Chem. Phys.*, **10**, 4047-4063, doi:10.5194/acp-10-4047-2010.
- [57] Wang, H. G. Feingold, R. Wood, and J. Kazil, 2010: Precipitation and cloud cellular structures in marine stratocumulus over the southeast Pacific: Model simulations. *Atmos. Chem. Phys.*, **10**, 6347-6362, doi:10.5194/acp-10-6347-2010.
- [58] Bretherton, C. S., R. Wood, R. C. George, D. Leon, G. Allen, and X. Zheng, 2010: Southeast Pacific stratocumulus clouds, precipitation and boundary layer structure sampled along 20S during VOCALS-REx. *Atmos. Chem. Phys.*, **10**, 10639-10654.
- [59] Chand, D., D.A. Hegg, R. Wood, G.E. Shaw, D. Wallace and D. S. Covert, 2010: Source Attribution of Climatically Important Aerosol Properties measured at Paposo (Chile) during VOCALS. *Atmos. Chem. Phys.*, **10**, 10789-10801, 2010.
- [60] Wood, R., C. S. Bretherton, D. Leon, A. D. Clarke, P. Zuidema, G. Allen, and H. Coe, 2011: An aircraft case study of the spatial transition from closed to open mesoscale cellular convection. *Atmos. Chem. Phys.*, **11**, 2341-2370, doi:10.5194/acp-11-2341-2011.
- [61] Wood, R, C. S. Bretherton, C. R. Mechoso, R. A. Weller, B. Huebert, F. Straneo, B. A. Albrecht, H. Coe, G. Allen, G. Vaughan, P. Daum, C. Fairall, D. Chand, L. Gallardo Klenner, R. Garreaud, C. Grados Quispe, D. S. Covert, T. S. Bates, R. Krejci, L. M. Russell, S. de Szoeki, A. Brewer, S. E. Yuter, S. R. Springston, A. Chaigneau, T. Toniazzo, P. Minnis, R. Palikonda, S. J. Abel, W. O. J.

- Brown, S. Williams, J. Fochesatto, J. Brioude, 2011: The VAMOS Ocean-Cloud-Atmosphere-Land Study Regional Experiment (VOCALS-REx): Goals, platforms, and field operations. *Atmos. Chem. Phys.* **11**, 627-654.
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- [69] Wood, R., 2012: Stratocumulus Clouds. *Mon. Wea. Rev.*, **140**, 2373-2423.
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Community position papers are intended to address current and future research and intellectual challenges that must be tackled by WCRP, and in so doing engage the next generation of scientists who will lead the WCRP over the years and decades ahead.
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