

V I T A

ROBERT A. HOUZE, JR.

Professor Emeritus of Atmospheric Sciences, University of Washington
Laboratory Fellow, Pacific Northwest National Laboratory

Education

1967	B.S.	Meteorology	Texas A & M University
1969	S.M.	Meteorology	Massachusetts Institute of Technology
1972	Ph.D.	Meteorology	Massachusetts Institute of Technology

Position history

1972-78	Assistant Professor, Atmospheric Sciences, University of Washington
1978-83	Associate Professor, Atmospheric Sciences, University of Washington
1983-2017	Professor of Atmospheric Sciences, University of Washington
2015-	Joint appointment with the Pacific Northwest National Laboratory, as Laboratory Fellow
2017-	Professor Emeritus of Atmospheric Sciences

Guest appointments

1988-89	Guest Professor, Atmospheric Physics, Swiss Federal College of Technology, Zürich
2008	Guest Professor, Rosenstiel School of Marine and Atmospheric Science, Univ. of Miami

Honors and Awards

2014	Symons Gold Medal of the Royal Meteorological Society
2006	Carl-Gustaf Rossby Research Medal, American Meteorological Society
2002	Highly Cited Researcher, Institute of Scientific Information
1989	Distinguished Authorship Award, National Oceanic and Atmospheric Administration
1982	Clarence Leroy Meisinger Award, American Meteorological Society
1982	Editor's Award, American Meteorological Society

Fellowships of Scientific Societies

2014	Fellow of the Royal Meteorological Society
2012	Fellow of the American Geophysical Union
2013	Fellow of the American Association for the Advancement of Science
1983	Fellow of the American Meteorological Society

Honorary Lectureships

2012	Bjerknes Lecturer, American Geophysical Union
2006	Thompson Lecturer, National Center for Atmospheric Research
1996	Houghton Lecturer, Massachusetts Institute of Technology

Field Programs

1974	GATE: Global Atmospheric Research Program's Atlantic Tropical Experiment (Africa)
1974-9	CYCLES: Cyclonic Extratropical Storms Project (Washington State and Pacific Coast)
1978-9	MONEX: Monsoon Experiment (Malaysia and India)
1984	Hurricane Norbert airborne observational study (eastern tropical Pacific)
1985	PRE-STORM: Preliminary Regional Experiment for STORM-Central (Kansas, Oklahoma)
1987	EMEX: Equatorial Mesoscale Experiment (Australia)
1991	CaPE: Convective and Precipitation Electrification field project (Florida)
1992-3	TOGA COARE: Tropical Ocean Global Atmosphere Program Coupled Ocean Atmosphere Response Experiment (Solomon Islands)
1993	COAST: Coastal Observations & Simulation with Topography Exp. (Pacific NW Coast)
1999	KWAJEX: Kwajalein Experiment (Marshall Islands)

- 1999 MAP: Mesoscale Alpine Programme (European Alps)
- 2001 IMPROVE II: Improvement of Microphysical Parameterization through Observational Verification Experiment (Oregon)
- 2005 RAINEX: Hurricane Rainband and Intensity Change Experiment (Gulf of Mexico & Atlantic Ocean)
- 2010 GRIP: Hurricane Genesis and Rapid Intensification Processes Experiment (Gulf of Mexico)
- 2011 DYNAMO/AMIE: Dynamics of the MJO/ARM MJO Investigation Experiment (Maldives)
- 2012-14 HS3: NASA Hurricane and Severe Storm Sentinel program (Atlantic Ocean)
- 2015 OLYMPEX: NASA Ground Validation Experiment for GPM (Olympic Mountains)

Service

- 1977-82 American Meteorological Society, Committee on Radar Meteorology (Chair)
- 1983-86 National Science Foundation Advisory Committee for Atmospheric Sciences
- 1984-86 American Meteorological Society Committee on Cloud Physics
- 1985-88 National Center for Atmospheric Research Advisory Panel, Field Observing Facility (Chair)
- 1986- NASA Tropical Rainfall Measuring Mission (TRMM) and Precipitation Measurement Mission (TRMM and GPM) Science Team
- 1991-93 Scientific Working Group, Tropical Ocean Global Atmosphere Coupled Ocean-Atmosphere Response Experiment (TOGA COARE)
- 1998-2007 Steering Committee Mesoscale Alpine Programme (MAP), U. S. Co-Chair
- 2005-14 Department of Energy Atmospheric System Research Program (ASR) Science Team
- 2007-15 NASA CloudSat Science Team
- 2009-14 NASA Hurricane Science Program Science Team
- 2012-17 American Meteorological Society Researcher Involvement Committee
- 2013-16 American Geophysical Union, Chair, Atmos. Sci. Section, Fellows Committee
- 2017- American Geophysical Union, Union Fellows Committee

Editorship

- 1979-91 Associate Editor, *Journal of the Atmospheric Sciences*
- 2002-3 Guest Associate Editor, *Quarterly Journal of the Royal Meteorological Society*, Special Issue on the Mesoscale Alpine Programme
- 2002-3 Co-Editor, AMS Monograph on Richard Reed
- 2010-14 Editor, *Journal of the Atmospheric Sciences*
- 2014- International Advisory Board, *Terrestrial, Atmospheric, and Oceanic Sciences*

Books

- Houze, R. A., Jr., 1993: *Cloud Dynamics*. Academic Press, San Diego, 573 pp.
- Johnson, R. H., and R. A. Houze, Jr., Eds, 2003: *A Half Century of Progress in Meteorology: A Tribute to Richard Reed. Meteor. Monogr.*, No. 53, American Meteorological Society, Boston, 139 pp.
- Houze, R. A., Jr., 2014: *Cloud Dynamics 2nd Edition*, Academic Press/Elsevier, 431 pp.

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- ISI 68
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OTHER PUBLICATIONS

1964

Houze, R. A., Jr., 1964: An introduction to the Weather Bureau. Student Trainee Report, U.S. Dept. of Commerce, Weather Bureau, p. 25.

1969

Houze, R. A., Jr., 1969: *Characteristics of Mesoscale Precipitation Areas*. S. M. thesis, Dept. of Meteorology, Massachusetts Institute of Technology, Cambridge, MA, 77 pp.

1970

Austin, P. M., and R. A. Houze, Jr., 1970: Analysis of mesoscale precipitation areas. Proceedings, *14th Conference on Radar Meteorology*, Boston, American Meteorological Society, 329-334. Abstract in *Bull. Amer. Meteor. Soc.*, **51**, p. 780.

1972

Austin, P. M., and R. A. Houze, Jr., 1972: Analysis of the structure of precipitation patterns in New England. *J. Appl. Meteor.*, **11**, 926-935.

Houze, R. A., Jr., 1972: *Development and Application of a Method for Computing Cumulus Transports*. Ph.D. thesis, Department of Meteorology, Massachusetts Institute of Technology, Cambridge, MA, 184 pp.

1973

Austin, P. M., and R. A. Houze, Jr., 1973: A technique for computing vertical transports by precipitating cumuli. *J. Atmos. Sci.*, **30**, 1100-1111.

Houze, R. A., Jr., 1973: A climatological study of vertical transports by cumulus-scale convection. *J. Atmos. Sci.*, **30**, 1112-1123.

1974

Hobbs, P. V., R. A. Houze, Jr., and T. J. Matejka, 1974: Air motions and cloud structure in a frontal system in the Pacific Northwest. Preprints, *Conference on Cloud Physics*, Tucson, American Meteorological Society, 418-423.

Hobbs, P. V., R. A. Houze, Jr., T. J. Matejka, L. F. Radke, D. G. Atkinson, and R. R. Weiss, 1974: The dynamical and microphysical structure of an occluded front and its modification by orography. Contributions from the Cloud Physics Group, University of Washington, Research Report IX.

1975

Hobbs, P. V., R. A. Houze, Jr., and T. J. Matejka, 1975: The dynamical and microphysical structure of an occluded frontal system and its modification by orography. *J. Atmos. Sci.*, **32**, 1542-1562.

Houze, R. A., Jr., 1975: Squall lines observed in the vicinity of the researcher during phase III of GATE. Proceedings, *16th Radar Meteorology Conference*, Houston, American Meteorological Society, 206-209.

1976

Baynton, H. W., C. L. Frush, R. J. Serafin, P. V. Hobbs, R. A. Houze, Jr., and J. D. Locatelli, 1976: Wind and divergence measurements in extratropical cyclones from Doppler radar. Preprints, *17th Conference on Radar Meteorology*, Seattle, American Meteorological Society, 232-238.

Hobbs, P. V., and R. A. Houze, Jr., 1976: Mesoscale structure of precipitation in extratropical cyclones. Preprints, *International Conference on Cloud Physics*, Boulder, American Meteorological Society, 488-493.

Hobbs, P. V., R. A. Houze, Jr., J. D. Locatelli, P. H. Herzegh, L. F. Radke, D. G. Atkinson, R. R. Weiss, and K. R. Biswas, 1976: Dynamical and microphysical structures of cyclonic storms in the Pacific Northwest (the CYCLES Project). Research Report XI, Cloud Physics Group, University of Washington, 166 pp.

Houze, R. A., Jr., 1976: GATE radar observations of a tropical squall line. Preprints, *17th Conference on Radar Meteorology*, Seattle, American Meteorological Society, 384-389.

Houze, R. A., Jr., and C. A. Leary, 1976: Comparison of convective mass and heat transports in tropical easterly waves computed by two methods. *J. Atmos. Sci.*, **33**, 424-429.

Houze, R. A., Jr., J. D. Locatelli, and P. V. Hobbs, 1976: Dynamics and cloud microphysics of the rainbands in an occluded frontal system. *J. Atmos. Sci.*, **33**, 1921-1936.

Houze, R. A., Jr., P. V. Hobbs, K. R. Biswas, and W. M. Davis, 1976: Mesoscale rainbands in extratropical cyclones. *Mon. Wea. Rev.*, **104**, 868-878.

Houze, R. A., Jr., P. V. Hobbs, K. R. Biswas, and W. M. Davis, 1976: Mesoscale structure of rainfall in occluded cyclones. Preprints, *Sixth Conference on Weather Forecasting and Analysis*, Albany, American Meteorological Society, 310-317. (Invited paper)

Leary, C. A., and R. A. Houze, Jr., 1976: Analysis of GATE radar data for a tropical cloud cluster in an easterly wave. Preprints, *17th Conference on Radar Meteorology*, Seattle, American Meteorological Society, 376-383.

Matejka, T. J., and R. A. Houze, Jr., 1976: The internal structure of mesoscale precipitation features in extratropical cyclonic storms. Preprints, *17th Conference on Radar Meteorology*, Seattle, American Meteorological Society, 264-269.

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Baynton, H. W., R. J. Serafin, C. L. Frush, G. R. Gray, P. V. Hobbs, R. A. Houze, Jr., and J. D. Locatelli, 1977: Real-time wind measurement in extratropical cyclones by means of Doppler radar. *J. Appl. Meteor.*, **16**, 1022-1028.

Houze, R. A., Jr., 1977: Structure and dynamics of a tropical squall-line system. *Mon. Wea. Rev.*, **105**, 1540-1567.

Houze, R. A. Jr., and C. -P. Cheng, 1977: Radar characteristics of tropical convection observed during GATE: Mean properties and trends over the summer season. *Mon. Wea. Rev.*, **105**, 964-980.

1978

Hobbs, P. V., J. D. Locatelli, T. J. Matejka, and R. A. Houze, Jr., 1978: Air motions, mesoscale structure, and cloud microphysics associated with a cold front. Preprints, *Conference on Cloud Physics and Atmospheric Electricity*, Issaquah, American Meteorological Society, 277-283.

Houze, R. A., Jr., P. V. Hobbs, P. H. Herzegh, and D. B. Parsons, 1978: Airborne measurements of the size distributions of precipitation particles in frontal clouds. Preprints, *Conference on Cloud Physics and Atmospheric Electricity*, Issaquah, American Meteorological Society, 168-172.

- Leary, C. A., and R. A. Houze, Jr., 1978: Mesoscale vertical air motions in intense tropical convection. Preprints, *Conference on Cloud Physics and Atmospheric Electricity*, Issaquah, American Meteorological Society, 435-442.
- Leary, C. A., and R. A. Houze, Jr., 1978: Observations of horizontally uniform precipitation and radar bright bands in the tropics. Preprints, *18th Conference on Radar Meteorology*, Atlanta, American Meteorological Society, 1-8.
- Matejka, T. J., and R. A. Houze, Jr., 1978: Doppler-radar measurements of the airflow within a mesoscale cold-frontal rainband. Preprints, *18th Conference on Radar Meteorology*, Atlanta, American Meteorological Society, 17-22.
- Matejka, T. J., R. A. Houze, Jr., and P. V. Hobbs, 1978: Microphysical and dynamical structure of mesoscale cloud features in extratropical cyclones. Preprints, *Conference on Cloud Physics and Atmospheric Electricity*, Issaquah, American Meteorological Society, 292-299.
- 1979**
- Cheng, C.-P., and R. A. Houze, Jr., 1979: The distribution of convective and mesoscale precipitation in GATE radar echo patterns. *Mon. Wea. Rev.*, **107**, 1370-1381.
- Houze, R. A., Jr., 1979: Cloud and precipitation structure of mesoscale systems in GATE. Proceedings, *Impact of GATE on Large-scale Numerical Modeling of the Atmosphere and Ocean*, Woods Hole, National Academy of Sciences, 100-108. (Invited paper)
- Houze, R. A., Jr., P. V. Hobbs, P. H. Herzegh, and D. B. Parsons, 1979: Size distributions of precipitation particles in frontal clouds. *J. Atmos. Sci.*, **36**, 156-162.
- Leary, C. A., and R. A. Houze, Jr., 1979: Melting and evaporation of hydrometeors in precipitation from the anvil clouds of deep tropical convection. *J. Atmos. Sci.*, **36**, 669-679.
- Leary, C. A., and R. A. Houze, Jr., 1979: The structure and evolution of convection in a tropical cloud cluster. *J. Atmos. Sci.*, **36**, 437-457.
- 1980**
- Cheng, C.-P., and R. A. Houze, Jr., 1980: Sensitivity of diagnosed convective fluxes to model assumptions. *J. Atmos. Sci.*, **37**, 774-783.
- Hobbs, P. V., T. J. Matejka, P. H. Herzegh, J. D. Locatelli, and R. A. Houze, Jr., 1980: The mesoscale and microscale structure and organization of clouds and precipitation in midlatitude cyclones. I: A case study of a cold front. *J. Atmos. Sci.*, **37**, 568-596.
- Houze, R. A., Jr., 1980: Review of *The Atmosphere-An Introduction to Meteorology*, by F. K. Lutgens and E. J. Tarbuck, *EOS*, **61**, 34-35.
- Houze, R. A., Jr., C.-P. Cheng, C. A. Leary, and J. F. Gamache, 1980: Diagnosis of cloud mass and heat fluxes from radar and synoptic data. *J. Atmos. Sci.*, **37**, 754-773.
- Houze, R. A., Jr., P. V. Hobbs, D. B. Parsons, and P. H. Herzegh, 1980: Reply to comments on 'Size distributions of precipitation particles in frontal clouds'. *J. Atmos. Sci.*, **37**, 699-700.
- Houze, R. A., Jr., S. A. Rutledge, T. J. Matejka, and P. V. Hobbs, 1980: Air motions and water budget of a warm frontal rainband. Preprints, *19th Conference on Radar Meteorology*, Miami, American Meteorological Society, 23-29.

- Houze**, R. A., Jr., S. G. Geotis, F. D. Marks, Jr., and A. K. West, 1980: Observations of winter monsoon clouds and precipitation in the vicinity of north Borneo. *Communications à la VIII eme Conference Internationale sur la Physique des Nuages*, Vol. II, La Commission Internationale de Physique de Nuages Clermont-Ferrand, France, 619-622, Abstract in *Journal de Recherches Atmospheriques*, **13**, p. 328.
- Houze**, R. A., Jr., S. G. Geotis, F. D. Marks, Jr., and D. D. Churchill, 1980: Comparison of airborne and land-based radar measurements of precipitation during the winter monsoon experiment. Preprints, *19th Conference on Radar Meteorology*, Miami, American Meteorological Society, 162-168.
- Leary, C. A., and R. A. **Houze**, Jr., 1980: The contribution of mesoscale motions to the mass and heat fluxes of an intense tropical convective system. *J. Atmos. Sci.*, **37**, 784-796.
- Matejka, T. J., R. A. **Houze**, Jr., and P. V. Hobbs, 1980: Microphysics and dynamics of clouds associated with mesoscale rainbands in extratropical cyclones. *Quart. J. Roy. Meteor. Soc.*, **106**, 29-56.
- 1981**
- Gamache, J. F., and R. A. **Houze**, Jr., 1981: The water budget of a tropical squall-line system. Preprints, *20th Conference on Radar Meteorology*, Boston, American Meteorological Society, 346-352.
- Houze**, R. A., Jr., 1981: Quality of GATE radar data. Statement prepared for *WMO International GATE Monograph*, 9 pp.
- Houze**, R. A., Jr., 1981: Structures of atmospheric precipitation systems-A global survey. *Radio Science*, **16**, 671-689. (Invited paper)
- Houze**, R. A., Jr., and A. K. Betts, 1981: Convection in GATE. *Rev. Geophys. Space Phys.*, **19**, 541-576.*
- Houze**, R. A., Jr., and C.-P. Cheng, 1981: Inclusion of mesoscale updrafts and downdrafts in computations of vertical fluxes by ensembles of tropical clouds. *J. Atmos. Sci.*, **38**, 1751-1770.
- Houze**, R. A., Jr., and D. D. Churchill, 1981: Development and structure of winter monsoon cloud systems. Proceedings, *International Conference on Scientific Results of the Monsoon Experiments*, Denpasar, Bali, Indonesia, World Meteorological Organization, 2-36-2-39.
- Houze**, R. A., Jr., S. A. Rutledge, T. J. Matejka, and P. V. Hobbs, 1981: The mesoscale and microscale structure and organization of clouds and precipitation in midlatitude cyclones. III: Air motions and precipitation growth in a warm-frontal rainband. *J. Atmos. Sci.*, **38**, 639-649.
- Houze**, R. A., Jr., S. G. Geotis, F. D. Marks, Jr., and A. K. West, 1981: Winter monsoon convection in the vicinity of north Borneo. Part I: Structure and time variation of the clouds and precipitation. *Mon. Wea. Rev.*, **109**, 1595-1614.
- Houze**, R. A., Jr., S. G. Geotis, F. D. Marks, Jr., and A. K. West, 1981: Convection over the southern south China Sea during December 1978. Part I: Structure of the clouds and precipitation. Proceedings, *International Conference on Early Results of FGGE and Large-scale Aspects of its Monsoon Experiments*, Global Atmospheric Research Program, World Meteorological Organization, Geneva, 10-36-10-40.

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1982

Gamache, J. F., and R. A. **Houze**, Jr., 1982: Mesoscale air motions associated with a tropical squall line. *Mon. Wea. Rev.*, **110**, 118-135.

Houze, R. A., Jr. 1982: Cloud clusters and large-scale vertical motions in the tropics. *J. Meteor. Soc. Japan*, **60**, 396-410. (Invited paper)

Houze, R. A., Jr., and B. F. Smull, 1982: Comparison of an Oklahoma squall line to mesoscale convective systems in the tropics. Preprints, *12th Conference on Severe Local Storms*, San Antonio, American Meteorological Society, 338-341.

Houze, R. A., Jr., and P. V. Hobbs, 1982: Organization and structure of precipitating cloud systems. *Adv. Geophys.*, **24**, 225-315.

1983

Gamache, J. F., and R. A. **Houze**, Jr., 1983: Water budget of a mesoscale convective system in the tropics. *J. Atmos. Sci.*, **40**, 1835-1850.

Marks, F. D., Jr., and R. A. **Houze**, Jr., 1983: Three-dimensional wind field in the developing inner core of Hurricane Debby. Preprints, *21st Conference on Radar Meteorology*, Edmonton, Alberta, American Meteorological Society, 298-304.

1984

Churchill, D. D., and R. A. **Houze**, Jr., 1984: Development and structure of winter monsoon cloud clusters on 10 December 1978. *J. Atmos. Sci.*, **41**, 933-960.

Churchill, D. D., and R. A. **Houze**, Jr., 1984: Mesoscale updraft magnitude and cloud-ice content deduced from the ice budget of the stratiform region of a tropical cloud cluster. *J. Atmos. Sci.*, **41**, 1717-1725.

Hartmann, D. L., H. H. Hendon, and R. A. **Houze**, Jr., 1984: Some implications of the mesoscale circulations in tropical cloud clusters for large-scale dynamics and climate. *J. Atmos. Sci.*, **41**, 113-121.

Houze, R. A., Jr., and D. D. Churchill, 1984: Microphysical structure of precipitating clouds in winter MONEX. Postprints, *15th Technical Conference on Hurricanes and Tropical Meteorology*, Miami, American Meteorological Society, 527-532.

Houze, R. A., Jr., and D. D. Churchill, 1984: Microphysical structure of winter monsoon cloud clusters. *J. Atmos. Sci.*, **41**, 3405-3411.

Houze, R. A., Jr., and E. N. Rappaport, 1984: Air motions and precipitation structure of an early summer squall line over the eastern tropical Atlantic. *J. Atmos. Sci.*, **41**, 553-574.

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Marks, F. D., Jr., and R. A. Houze, Jr., 1984: Airborne Doppler-radar observations in Hurricane Alicia. Preprints, *22nd Conference on Radar Meteorology*, Zürich, American Meteorological Society, 578-583.

Smull, B. F., and R. A. Houze, Jr., 1984: Dual-Doppler radar analysis of an Oklahoma squall-line system. Preprints, *22nd Conference on Radar Meteorology*, Zürich, American Meteorological Society, 43-48.

1985

Churchill, D. D., and R. A. Houze, Jr., 1985: Precipitation mechanisms in a Bay of Bengal depression. Extended Abstracts, *16th Conference on Hurricanes and Tropical Meteorology*, Houston, American Meteorological Society, 18-19.

Gamache, J. F., and R. A. Houze, Jr., 1985: Further analysis of the composite wind and thermodynamic structure of the 12 September GATE squall line. *Mon. Wea. Rev.*, **113**, 1241-1259.

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Smull, B. F., and R. A. Houze, Jr., 1985: A midlatitude squall line with a trailing region of stratiform rain: Radar and satellite observations. *Mon. Wea. Rev.*, **113**, 117-133.

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1988

Biggerstaff, M. I., R. A. Houze, Jr., and S. A. Rutledge, 1988: Vertical drafts in the convective regions of mesoscale convective systems in Kansas. Proceedings, *Tenth International Cloud Physics Conference*, Bad Homburg, Federal Republic of Germany, 705-707.

Gamache, J. F., F. D. Marks, Jr., R. A. Black, and R. A. Houze, Jr., 1988: The bulk water budget of Hurricane Norbert (1984) as determined from thermodynamic and microphysical analyses retrieved from airborne Doppler radar. Proceedings, *Tenth International Cloud Physics Conference*, Bad Homburg, Federal Republic of Germany, 711-713.

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1989

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- Mapes, B., M. I. Biggerstaff, and R. A. Houze, Jr., 1989: The structure of vertical drafts in nocturnal oceanic tropical cloud clusters observed during EMEX. Preprints, *18th Conference on Hurricanes and Tropical Meteorology*, San Diego, American Meteorological Society, 194-195.
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