*CURRICULUM VITAE*

# WOJCIECH W. GRABOWSKI, PhD, DSc, FRMetS

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## EDUCATION:

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| Ph.D. | 1987 | Institute of Geophysics, Polish Academy of Science, Warsaw, Poland (Dissertation: "Mechanisms of precipitation redistribution in complex terrain", in Polish) |
| M.S. | 1981 | Department of Physics, University of Warsaw, Poland (Dissertation: "Investigation of cloud and fog droplets by the holographic method", in Polish) |

## SCIENTIFIC INTERESTS:

Geophysical fluid dynamics and cloud physics in general; numerical modeling; numerical methods for fluid dynamics; moist convection; turbulence; small-scale dynamics; cloud microphysics and its parameterization; convection and its interaction with radiative, surface, and large–scale processes; role of clouds in the climate system.

## PROFESSIONAL EXPERIENCE

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| 2005–present | Senior Scientist, Mesoscale and Microscale Meteorology Division, National Center for Atmospheric Research, Boulder, Colorado. |
| 2000–2005 | Scientist III, Mesoscale and Microscale Meteorology Division, National Center for Atmospheric Research, Boulder, Colorado. |
| 1996–2000 | Scientist II, Mesoscale and Microscale Meteorology Division, National Center for Atmospheric Research, Boulder, Colorado. |
| 1993–1996 | Scientist I, Mesoscale and Microscale Meteorology Division, National Center for Atmospheric Research, Boulder, Colorado. |

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| 1989–1993 | Visiting Scientist, Mesoscale and Microscale Meteorology Division, National Center for Atmospheric Research, Boulder, Colorado. |
| 1987–1989 | Postdoctoral Fellow, Advanced Study Program, National Center for Atmospheric Research, Boulder, Colorado. |
| 1986–1987 | Research Fellow, Institute of Geophysics, Polish Academy of Sciences, Warsaw, Poland. |
| 1983–1986 | Graduate Research Assistant (Ph.D. Program), University of Warsaw and Polish Academy of Science, Poland. |
| 1981–1983 | Research Assistant, Division of Atmospheric Physics, Institute of Meteorology and Water Management, Warsaw, Poland. |

## HONORS AND AWARDS

2020 Fellow, American Meteorological Society (AMS), USA.
2013 Titular Professor of Physical Sciences of the Republic of Poland.
2011 J. Atmos. Sci. Editor's Award.
2010 Fellow, Royal Meteorological Society (FRMetS), UK.
2005 Royal Meteorological Society Reviewer Award.
1999 Habilitation (D.Sc.), Institute of Geophysics, Polish Academy of Sciences, Warsaw, Poland.
1999 NCAR/MMM Outstanding Paper of the Year Award
1995 NCAR Publication Award nominee

## OTHER ACTIVITIES

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| 2017–2020 | Head, Dynamical and Physical Meteorology Section, MMM Laboratory, NCAR. |
| 2017–present | International Collaborator, Australian Centre of Excellence for Climate Extremes. |
| 2016–2017 | Visiting Professor (POLONEZ Scholar), Institute of Geophysics, Faculty of Physics, University of Warsaw, Poland. |
| 2014 | Organizer of the 4th EULAG model workshop, (October, University of Mainz, Germany). |
| 2012 | NCAR Science Advisor |
| 2012 | Organizer and co-chair of the 3rd EULAG model workshop, (June, Loughborough, UK); 8th International Cloud Modeling Workshop (July, Warsaw, Poland); and NCAR/GTP workshop on multiphase turbulent flows (August, Boulder, USA). |
| 2012-present | Affiliate Professor, University of Warsaw, Warsaw, Poland |

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| 2012-2019 | Editor, *Journal of the Atmospheric Sciences* |
| 2010-2017 | International Collaborator, Australian Centre of Excellence in Climate System Science |
| 2008-2011 | Associate Editor for *Journal of Advances in Modeling Earth Systems* (JAMES) |
| 2008-2009 | CNRM Meteo-France Visiting Fellow, Toulouse, France |
| 2006-2011 | Associate Editor for *Journal of the Atmospheric Sciences* |
| 2006-2010 | Board of Directors, Canadian Cloud-Aerosol Feedbacks and Climate (CAFC) Network |
| 2005 | Guest Editor, 14th International Conference on Clouds and Precipitation Special Issue of Atmospheric Research |
| 2004 | Organizer and co-chair of the International Cloud Modeling Workshop, Hamburg, Germany |
| 2004 | Guest Editor, EUROCS Special Issue of *Quarterly Journal of the Royal Meteorological Society* |
| 2003-present | Member of the Editorial Board of *Acta Geophysica* |
| 2002-2005 | Affiliate Faculty, Colorado State University |
| 2001-2018 | Adjoint Professor of Mechanical Engineering, University of Delaware |
| 2001-2004 | Chair, Working Group 4 (Precipitating Convective Cloud Systems), GEWEX (Global Energy and Water-cycle Experiment) Cloud System Study |
| 2001-2008 | Associate Editor for *Quarterly Journal of the Royal Meteorological Society* |
| 2001-present | Member of the Geophysical Turbulence Program, NCAR |
| 2000-2008 | Member of the International Commission on Clouds and Precipitation (ICCP), International Association of Meteorology and Atmospheric Sciences (IAMAS), International Union of Geodesy and Geophysics (IUGG) |
| 2000-2012 | Associate Editor for *Atmospheric Science Letters* |
| 1999-2001 | MMM Seminar coordinator |
| 1995-1998 | Member of the Committee on Cloud Physics of the American Meteorological Society |

1981-present Invited speaker and participant in numerous international and national conferences and workshops in the fields of geophysics, numerical modeling, cloud physics, cloud modeling, tropical meteorology, turbulence and diffusion, forecasting and nowcasting (North and South America, Europe, Asia, Australia).

**REFEREED PUBLICATIONS:**

1. Grabowski, W. W., 1983: Measurement of the size and position of aerosol droplets using holography, Optics Laser Tech., 4, 199–205.

2. Grabowski, W. W., 1985: On the influence of microphysics parameterization on the rainfall rates in numerical models of clouds, Pure Appl. Geophys., 123, 941–950.

3. Grabowski, W. W., 1988: On the bulk parameterization of snow and its application to the quantitative studies of precipitation growth, Pure Appl. Geophys., 127, 79–92.

4. Grabowski, W. W., 1989: On the influence of small scale topography on precipitation, Quart. J. Roy. Met. Soc., 115, 633–650.

5. Grabowski, W. W., 1989: Numerical experiments on the dynamics of the cloud-environment interface: small cumulus in a shear-free environment, J. Atmos. Sci., 46, 3513–3541.

6. Smolarkiewicz, P. K. and W. W. Grabowski, 1990: The multidimensional positive definite advection transport algorithm: Nonoscillatory option, J. Comput. Phys., 86, 355–375.

7. Grabowski, W. W. and P. K. Smolarkiewicz, 1990: Monotone finite difference approximations to the advection-condensation problem, Mon. Wea. Rev., 118, 2082–2097.

8. Grabowski, W. W. and T. L. Clark, 1991: Cloud-environment interface instability: Rising thermal calculations in two spatial dimensions. J. Atmos. Sci., 48, 527–546.

9. Brenguier, J-L. and W. W. Grabowski, 1993: Cumulus entrainment and cloud droplet spectra: A numerical model within a two-dimensional dynamical framework. J. Atmos. Sci., 50, 120–136.

10. Grabowski, W. W. and T. L. Clark, 1993: Cloud-environment interface instability, Part II: Extension to three spatial dimensions. J. Atmos. Sci., 50, 555–573.

11. Grabowski, W. W. and T. L. Clark, 1993: Cloud-environment interface instability, Part III: Direct influence of environmental shear. J. Atmos. Sci., 50, 3821–3828.

12. Grabowski, W. W., 1993: Cumulus entrainment, fine-scale mixing and buoyancy reversal. Quart. J. Roy. Met. Soc., 119, 935–956.

13. Grabowski, W. W., and H. Pawlowska, 1993: Entrainment and mixing in clouds: the Paluch mixing diagram revisited. J. Appl. Meteor., 32, 1767–1773.

14. Grabowski, W. W., 1995: Entrainment and mixing in buoyancy reversing convection with applications to cloud-top entrainment instability. Quart. J. Roy. Met. Soc., 121, 231–253.

15. Grabowski, W. W. and P. K. Smolarkiewicz, 1996: On two-time-level semi-Lagrangian modeling of precipitating clouds. Mon. Wea. Rev. 124, 487–497.

16. Grabowski, W. W., M. W. Moncrieff, and J. T. Kiehl, 1996: Long-term behavior of precipitating tropical cloud systems: a numerical study. Quart. J. Roy. Met. Soc., 122, 1019–1042.

17. Grabowski, W. W., X. Wu, and M. W. Moncrieff, 1996: Cloud resolving modeling of tropical cloud systems during Phase III of GATE. Part I: Two–dimensional experiments. J. Atmos. Sci. 53, 3684–3709.

17. Vaillancourt, P. A., M. K. Yau, and W. W. Grabowski, 1997: Upshear and downshear evolution of cloud structure and cloud properties. J. Atmos. Sci. 54, 1203–1217.

18. Malinowski, P. S., W. W. Grabowski, 1997: Local increase in concentration of cloud droplets and water content resulting from turbulent mixing. J. Tech. Phys. 38, 397–406.

19. Szumowski, M. J., W. W. Grabowski, and H. T. Ochs, 1998: Simple two–dimensional kinematic framework designed to test warm rain microphysical models. Atmos. Res. 45, 299–326.

20. Wu, X., W. W. Grabowski, and M. W. Moncrieff, 1998: Long–term behavior of cloud systems in TOGA COARE and their interactions with radiative and surface processes. Part I: Two-dimensional modeling study. J. Atmos. Sci., 55, 2693–2714.

21. Grabowski, W. W., X. Wu, M. W. Moncrieff, and W. D. Hall, 1998: Cloud resolving modeling of tropical cloud systems during Phase III of GATE. Part II: Effects of resolution and the third spatial dimension. J. Atmos. Sci., 55, 3264–3282.

22. Grabowski, W. W., 1998: Toward cloud resolving modeling of large–scale tropical circulations: A simple cloud microphysics parameterization. J. Atmos. Sci., 55, 3283–3298.

23. Grabowski, W. W., and P. Vaillancourt, 1999: Comments on “Preferential concentration of cloud droplets by turbulence: effects on the early evolution of cumulus cloud droplet spectra” by Shaw et al. J. Atmos. Sci., 56, 1433–1436.

24. Grabowski, W. W., X. Wu, and M. W. Moncrieff, 1999: Cloud resolving modeling of tropical cloud systems during Phase III of GATE. Part III: Effects of microphysical parameterizations. J. Atmos. Sci., 56, 2384–2402.

25. Grabowski, W. W., 1999: A parameterization of cloud microphysics for long–term cloud–resolving modeling of tropical convection. Atmos. Res., 52, 17–41.

26. Grabowski, W. W., and P. K. Smolarkiewicz, 1999: CRCP: A Cloud Resolving Convection Parameterization for Modeling the Tropical Convecting Atmosphere. Physica D, 133, 171–178. (Special Issue: Predictability: Quantifying Uncertainty in Models of Complex Phenomena, 18th Annual Conference of the Center for Nonlinear Studies, Los Alamos, NM, USA, 11-15 May 1998).

27. Wu, X., W. D. Hall, W. W. Grabowski, M. W. Moncrieff, W. D. Collins, and J. T. Kiehl, 1999: Long–term behavior of cloud systems in TOGA COARE and their interactions with radiative and surface processes. Part II: Effects of cloud microphysics on cloud– radiation interaction. J. Atmos. Sci., 56, 3177–3195.

28. Grabowski, W. W., J.–I. Yano, and M. W. Moncrieff, 2000: Cloud–resolving modeling of tropical circulations driven by large–scale SST gradients. J. Atmos. Sci., 57, 2022– 2039.

29. Grabowski, W. W., 2000: Cloud microphysics and the tropical climate: cloud–resolving model perspective. J. Climate, 13, 2306-2322.

30. Yano, J.–I., W. W. Grabowski, G. L. Roff, and B. E. Mapes, 2000: Asymptotic approaches to convective quasi-equilibrium. Quart. J. Roy. Met. Soc., 126, 1861–1887.

31. Grabowski, W. W., 2000: Dynamics of cumulus entrainment. In *Geophysical and Astro-physical Convection*, R. Kerr and P. Fox, eds. Gordon and Breach Science Publishers, 107–127.

32. Grabowski, W. W., and M. W. Moncrieff, 2001: Large-scale organization of tropical convection in two-dimensional explicit numerical simulations. Quart. J. Roy. Met. Soc., 127, 445-468.

33. Liu, C., M. W. Moncrieff, and W. W. Grabowski, 2001: Hierarchical modeling of tropical convective systems using resolved and parameterized approaches. Quart. J. Roy. Met. Soc., 127, 493-515.

34. Grabowski, W. W., 2001: Coupling cloud processes with the large-scale dynamics using the Cloud-Resolving Convection Parameterization (CRCP). J. Atmos. Sci., 58, 978–997.

35. Vaillancourt, P., M. K. Yau, and W. W. Grabowski, 2001: Microscopic approach to cloud droplet growth by condensation. Part I: Model description and results without turbulence. J. Atmos. Sci., 58, 1945–1964.

36. Liu, C., M. W. Moncrieff, and W. W. Grabowski, 2001: Explicit and parameterized realizations of convective cloud systems in TOGA COARE. Mon. Wea. Rev., 129, 1689–1703.

37. Grabowski, W. W., and P. K. Smolarkiewicz, 2002: A multiscale anelastic model for meteorological research. Mon. Wea. Rev., 130, 939-956.

38. Yano, J.-I., M. W. Moncrieff, and W. W. Grabowski, 2002: Walker-type mean circulations and convectively-coupled tropical waves as an interacting system. J. Atmos. Sci., 59, 1566–1577.

39. Yano, J.–I., W. W. Grabowski, and W. M. Moncrief, 2002: Mean-state convective circulations over large-scale tropical SST gradients. J. Atmos. Sci., 59, 1578–1592.

40. Xu, K.-M., R. T. Cederwall, L. J. Donner, W. W. Grabowski, F. Guichard, D. E. Johnson, M. Khairoutdinov, S. K. Krueger, J. C. Petch, D. A. Randall, C. J. Seman, W. K. Tao, D. Wang, S. C. Xie, J. J. Yio, and M.-H. Zhang, 2002: An intercomparison of cloud-resolving models with the ARM summer 1997 IOP data. Quart. J. Roy. Met. Soc., 128, 593–624.

41. Grabowski, W. W., 2002: Large-scale organization of moist convection in idealized aqua-planet simulations. Int. J. Numer. Methods in Fluids, 39, 843–853.

42. Grabowski, W. W., and M. W. Moncrieff, 2002: Large-scale organization of tropical convection in two-dimensional explicit numerical simulations: Effects of interactive radiation. Quart. J. Roy. Met. Soc., 128, 2349–2375.

43. Vaillancourt, P. A., M. K. Yau, P. Bartello, and W. W. Grabowski, 2002: Microscopic approach to cloud droplet growth by condensation. Part II: Turbulence, clustering and condensational growth. J. Atmos. Sci., 59, 3421–3435.

44. Grabowski, W. W., 2003: Impact of ice microphysics on multiscale organization of tropical convection in two-dimensional cloud-resolving simulations. Quart. J. Roy. Met. Soc., 129, 67–81.

45. Grabowski, W. W., 2003: MJO-like coherent structures: Sensitivity simulations using the Cloud-Resolving Convection Parameterization (CRCP). J. Atmos. Sci., 60, 847–864.

46. Grabowski, W. W., 2003: Impact of cloud microphysics on convective-radiative quasi-equilibrium revealed by Cloud-Resolving Convection Parameterization (CRCP). J. Climate, 16, 3463–3475.

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48. Andrejczuk, M., W. W. Grabowski, S. P. Malinowski, and P. K. Smolarkiewicz, 2004: Numerical simulation of cloud-clear air interfacial mixing. J. Atmos. Sci., 61, 1726– 1739.

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50. Grabowski, W. W., and M. W. Moncrieff, 2004: Moisture-convection feedback in the Tropics. Quart. J. Roy. Met. Soc., 130, 3081–3104.

51. Guichard, F., J. C. Petch, J.-L. Redelsperger, P. Bechtold, J.-P. Chaboureau, S. Cheinet, W. Grabowski, H. Grenier, C. J. Jones, M. Kohler, J.-M. Piriou, R. Tailleux, and M. Tomasini, 2004: Modelling the diurnal cycle of deep precipitating convection over land with CRMs and SCMs. Quart. J. Roy. Met. Soc., 130, 3139–3172.

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53. Wang, L.-P., O. Ayala, and W. W. Grabowski, 2005: Improved formulations of the super-position method. J. Atmos. Sci., 62, 1255-1266.

54. Ziemianski, M. Z., W. W. Grabowski, and M. W. Moncrieff, 2005: Explicit convection over the western Pacific warm pool in the Community Atmospheric Model. J. Climate, 18, 1482-1502.

55. Wang, L.-P., O. Ayala, S. E. Kasprzak, and W. W. Grabowski, 2005: Theoretical formulation of collision rate and collision efficiency of hydrodynamically-interacting cloud droplets in turbulent atmosphere. J. Atmos. Sci., 62, 2433-2450.

56. Wang, L.-P., C. N. Franklin, O. Ayala, and W. W. Grabowski, 2006: Probability distributions of angle-of-approach and relative velocity for colliding droplets. J. Atmos. Sci., 63, 881-900.

57. Grabowski, W. W., P. Bechtold, A. Cheng, R. Forbes, C. Halliwell, M. Khairoutdinov, S. Lang, T. Nasuno J. Petch, W.-K. Tao, R. Wong, X. Wu, and K.-M. Xu, 2006: Daytime convective development over land: a model intercomparison based on LBA observations. Quart. J. Roy. Met. Soc., 132, 317-344.

58. Grabowski, W. W., 2006: Comments on “Preliminary tests of multiscale modeling with a two-dimensional framework: sensitivity to coupling methods” by Jung and Arakawa. Mon. Wea. Rev., 134, 2021-2026.

59. Grabowski, W. W., 2006: Impact of explicit atmosphere-ocean coupling on MJO-like coherent structures in idealized aquaplanet simulations. J. Atmos. Sci., 63, 2289-2306.

60. Grabowski, W. W., 2006: Indirect impact of atmospheric aerosols in idealized simulations of convective-radiative quasi-equilibrium. J. Climate, 19, 4664-4682.

61. Wang, L.-P., Y. Xue, O. Ayala, and W. W. Grabowski, 2006: Effects of stochastic coalescence and air turbulence on the size distribution of cloud droplets. Atmos. Res., 82, 416-432.

62. Wang, L.-P., O. Ayala, Y. Xue, and W. W. Grabowski, 2006: Comments on ”Droplets to drops by turbulent coagulation” by Riemer and Wexler. J. Atmos. Sci., 63, 2397-2401.

63. Pawlowska, H., W. W. Grabowski, and J.-L. Brenguier, 2006: Observations of the width of cloud droplet spectra in stratocumulus. Geophys. Res. Lett., 33, L19810, doi:10.1029/2006GL026841.

64. Andrejczuk, M., W. W. Grabowski, S. P. Malinowski, and P. K. Smolarkiewicz, 2006: Numerical simulation of cloud-clear air interfacial mixing: Effects on cloud microphysics. J. Atmos. Sci., 63, 3204-3225.

65. McFarlane, S. A., and W. W. Grabowski, 2007: Optical properties of shallow tropical cumuli derived from ARM ground-based remote sensing. Geophys. Res. Lett., 34, L06808, doi:10.1029/2006GL028767.

66. Barstad, I., W. W. Grabowski, and P. K. Smolarkiewicz, 2007: Characteristics of large- scale orographic precipitation: evaluation of linear model in idealized problems. J. Hydrology, 340, 78-90.

67. Wang, L.-P., O. Ayala, and W. W. Grabowski, 2007: Effects of aerodynamic interactions on the motion of heavy particles in a bidisperse suspension. J. Turbulence, doi:10.1080/14685240701233426.

68. Morrison, H., and W. W. Grabowski, 2007: Comparison of bulk and bin warm rain microphysics models using a kinematic framework. J. Atmos. Sci., 64, 2839-2861.

69. Grabowski, W. W., 2007: Representation of turbulent mixing and buoyancy reversal in bulk cloud models. J. Atmos. Sci., 64, 3666-3680.

70. Ayala, O., W. W. Grabowski, and L.-P. Wang, 2007: A hybrid approach for simulating turbulent collisions of hydrodynamically-interacting particles. J. Comput. Phys., 225, 51-73.

71. Wang, L.-P., Y. Xue, and W. W. Grabowski, 2007: Bin integral method for solving the kinetic collection equation. J. Comput. Phys., 226, 59-88.

72. Morrison, H., and W. W. Grabowski, 2008: Modeling supersaturation and subgrid-scale mixing with two-moment bulk warm microphysics. J. Atmos. Sci., 65, 792-812.

73. Grabowski, W. W., and H. Morrison, 2008: Toward the mitigation of spurious cloud-edge supersaturation in cloud models. Mon. Wea. Rev., 136, 1224-1234.

74. Xue, Y., L.-P. Wang, and W. W. Grabowski, 2008: Growth of cloud droplets by turbulent collision-coalescence. J. Atmos. Sci., 65, 331-356.

75. Slawinska, J., W. W. Grabowski, H. Pawlowska, and A. A. Wyszogrodzki, 2008: Optical properties of shallow convective clouds diagnosed from a bulk-microphysics large-eddy simulation. J. Climate, 21, 1639-1647.

76. Morrison, H., and W. W. Grabowski, 2008: A novel approach for representing ice micro-physics in models: description and tests using a kinematic framework. J. Atmos. Sci., 65, 1528-1548.

77. Malinowski, S. P., M. Andrejczuk, W. W. Grabowski, P. Korczyk, T. A. Kowalewski, and P. K. Smolarkiewicz, 2008: Laboratory and modeling studies of cloud-clear air interfacial mixing: anisotropy of small-scale turbulence due to evaporative cooling. New J. Phys., 10, 075020, doi:10.1088/1367-2630/10/7/075020.

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82. Wang, L.-P., and W. W. Grabowski, 2009: The role of air turbulence in warm rain initiation. Atmos. Sci. Let., 10, 1-8.

83. Grabowski, W. W., and L.-P. Wang, 2009: Diffusional and accretional growth of water drops in a rising adiabatic parcel: effects of the turbulent collision kernel. Atmos. Chem. Phys., 9, 2335-2353.

85. Jarecka, D., W. W. Grabowski, and H. Pawlowska, 2009: Modeling of subgrid-scale mixing in large-eddy simulation of shallow convection. J. Atmos. Sci., 66, 2125-2133.

86. Andrejczuk, M., W. W. Grabowski, S. P. Malinowski, and P. K. Smolarkiewicz, 2009: Numerical simulation of cloud-clear air interfacial mixing: Homogeneous versus inhomogeneous mixing. J. Atmos. Sci., 66, 2493-2500.

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88. Slawinska, J., W. W. Grabowski, and H. Morrison, 2009: Impact of atmospheric aerosols on precipitation from deep organized convection: A prescribed-flow modeling study using double-moment bulk microphysics. Quart. J. Roy. Met. Soc., 135, 1906-1913.

89. Xing, Y., A. J. Majda, and W. W. Grabowski, 2009: New efficient sparse space-time algorithms for superparameterization on mesoscales. Mon. Wea. Rev., 137, 4307- 4324.

90. Grabowski, W. W., O. Thouron, J.-P. Pinty, and J.-L. Brenguier, 2010: A hybrid bulk-bin approach to model warm-rain processes. J. Atmos. Sci., 67, 385-399.

91. Morrison, H., and W. W. Grabowski, 2010: An improved representation of rimed snow and conversion to graupel in a new multicomponent bin microphysics scheme. J. Atmos. Sci., 67, 1337-1360.

92. Andrejczuk, M., W. W. Grabowski, J. Reisner, and A. Gadian, 2010: Cloud-aerosol interactions for boundary-layer stratocumulus in the Lagrangian Cloud Model. J. Geophys. Res., 115, D22214, doi:10.1029/2010JD014248.

93. Grabowski, W. W., M. Andrejczuk, and L.-P. Wang, 2011: Droplet growth in a bin warm-rain scheme with Twomey CCN activation. Atmos. Res., 99, 290-301.

94. Grabowski, W. W., and H. Morrison, 2011: Indirect impact of atmospheric aerosols in idealized simulations of convective-radiative quasi-equilibrium. Part II: Double-moment microphysics. J. Climate, 24, 1897-1912.

95. Rasinski, P., H. Pawlowska, and W. W. Grabowski, 2011: Observations and kinematic modeling of drizzling marine stratocumulus. Atmos. Res., 102, 120-135.

96. Rosa, B., L.-P. Wang, M. R. Maxey, and W. W. Grabowski, 2011: An accurate model for aerodynamic interactions of cloud droplets. J. Comput. Phys., 230, 8109-8133.

97. Wyszogrodzki, A. A., W. W. Grabowski, and L.-P. Wang, 2011: Activation of cloud droplets in bin-microphysics simulation of shallow convection. Acta Geophysica (EULAG topical issue), 59, 1168-1183.

98. Grabowski, W. W., J. Slawinska, H. Pawlowska, and A. A. Wyszogrodzki, 2011: Macro- scopic impacts of cloud and precipitation processes in shallow convection. Acta Geophysica (EULAG topical issue), 59, 1184-1204.

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100. Slawinska, J., W. W. Grabowski, H. Pawlowska, and H. Morrison, 2012: Droplet activation and mixing in large-eddy simulation of a shallow cumulus field. J. Atmos. Sci., 69, 444-462.

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