

## CURRICULUM VITAE

### **RICHARD ROTUNNO**

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### **EDUCATION**

- 1976 Ph.D. in Geophysical Fluid Dynamics, Princeton University
- 1974 M.A. in Geophysical Fluid Dynamics, Princeton University
- 1972 M.S. in Mechanics, State University of New York at Stony Brook
- 1971 B.E. in Eng. Science, State University of New York at Stony Brook

### **PROFESSIONAL RECORD**

- 1999– National Center for Atmospheric Research,  
Assistant Director, Mesoscale and Microscale Meteorology
- 1989– National Center for Atmospheric Research, Senior Scientist
- 1985 Massachusetts Institute of Technology, Visiting Associate Professor  
(taught full semester course on numerical modeling)
- 1983–1989 National Center for Atmospheric Research, Scientist III
- 1980–1983 National Center for Atmospheric Research, Scientist II
- 1978–1979 Cooperative Institute for Research in Environmental Sciences,  
University of Colorado, Research Associate
- 1977–1978 Cooperative Institute for Research in Environmental Sciences,  
University of Colorado, Visiting Fellow
- 1976–1977 National Center for Atmospheric Research,  
Advanced Study Program, Postdoctoral Fellow

### **AWARDS AND HONORS**

- 2004 Jule G. Charney Award (American Meteorological Society)
- 2003 Harris Lecture (Texas A&M)
- 2001 Gal-Chen Memorial Lecture (University of Oklahoma)
- 1991 Banner I. Miller Award (with K. Emanuel) (AMS)  
Best Contribution to the Science of Hurricane and Tropical  
Weather Forecasting Published During the Years 1986–1990
- 1983 Ted Fujita Award for Best Graphics (with J. Klemp)  
13th Conference on Severe Local Storms (AMS)

### **PROFESSIONAL ACTIVITIES**

- 2005– American Meteorological Society Awards Committee
- 2004– North Carolina State University Adjunct Professor
- 2002-2005– Summer School on Mountain Meteorology, Trento, Italy  
(Coordinator and Lecturer)
- 2002– The Hemispheric Observing System Research  
and Predictability Experiment (THORPEX) Scientific Steering Committee
- 2002– Gran Combin Summer School, Valle d'Aosta, Italy (Lecturer)
- 2000– Mesoscale Alpine Programme (MAP) Scientific Steering Committee

- 1999–2001 *Quarterly Journal of the Royal Meteorological Society* Associate Editor
- 1998–2001 U.S. Weather Research Program Scientific Steering Committee
- 1994 Fellow of the American Meteorological Society (AMS)
- 1991 Chairman, National Academy of Science Panel on Coastal Meteorology
- 1990–1993 AMS Committee on Mesoscale Processes
- 1991–1997 *Monthly Weather Review* Associate Editor
- 1986–1991 *Monthly Weather Review* Co-Chief Editor
- 1986–1991 AMS Publications Commission
- 1985–1988 Cooperative Institute for Mesoscale Meteorological Studies (OU)  
Advisory Committee
- 1984 Department of Mathematics, Monash University,  
Australia (Guest Lecturer, February)
- 1983–1986 AMS Committee on Severe Local Storms
- 1981–1982 International Conference on Computational Methods and  
Experimental Measurements Advisory Committee
- 1981 Department of Mathematics, Monash University,  
Australia (Guest Lecturer, May–June)
- 1980–1983 AMS Committee on Atmospheric and Oceanic Waves and  
Stability

## PUBLICATIONS — Refereed

- Epifanio, C. C. and R. Rotunno, 2005: The dynamics of orographic wake formation in flows with upstream blocking. *J. Atmos. Sci.*, **62**, 3127-3150.
- Ralph, F. M. , P. J. Neiman and R. Rotunno, 2005: Dropsonde observations in low-level jets over the northeastern Pacific Ocean from CALJET-1998 and PACJET-2001: Mean Vertical-Profile and Atmospheric-River Characteristics. *Monthly Weather Review*, **133**, 889-910.
- Miglietta, M. M. and R. Rotunno, 2005: Numerical simulations of nearly moist neutral flow past a two-dimensional ridge. *J. Atmos. Sci.*, **62**, 1410-1427.
- Fedorovich, E. , R. Rotunno and B. Stevens, 2004: *Atmospheric Turbulence and Mesoscale Meteorology*, Cambridge University Press, 280pp.
- Rampanelli, G., D. Zardi, and R. Rotunno, 2004: Mechanisms of up-valley winds. *J. Atmos. Sci.*, **61**, 3097-3111.
- Moeng, C.-H., J. C. McWilliams, R. Rotunno, P. P. Sullivan, and J. Weil, 2004: Investigating 2D modeling of atmospheric convection in the PBL. *J. Atmos. Sci.*, **61** 889–903.
- Flamant, C., E. Richard, C. Schar, R. Rotunno, L. Nance, M. Sprenger and R. Benoit, 2004: The wake south of the Alps: dynamics and structure of the lee-side flow and secondary potential vorticity banners. *Quart. J. Roy. Meteor. Soc.*, **130**, 1-32.
- Tan, Z.-M., F. Zhang, C. Snyder and R. Rotunno, 2004: Mesoscale predictability of moist baroclinic waves. *J. Atmos. Sci.*, **61**, 1794-1804 .

- Weisman, M. L. and R. Rotunno, 2004: "A theory of strong, long-lived squall lines" revisited. *J. Atmos. Sci.*, **61**, 361-382.
- Rotunno, R. and M. L. Weisman, 2003: Comment on "Linear and nonlinear propagation of supercell thunderstorms." *J. Atmos. Sci.*, **60**, 2413-2419.
- Takemi, T. and R. Rotunno, 2003: The effects of subgrid model mixing and numerical filtering in simulations of mesoscale cloud systems. *Mon. Wea. Rev.*, **131**, 2085-2101.
- Zhang, F., C. Snyder and R. Rotunno, 2003: Effects of moist convection on mesoscale predictability. *J. Atmos. Sci.*, **60**, 1173-1185.
- Rotunno, R. and R. Ferretti, 2003: Orographic effects on rainfall in MAP cases IOP2b and IOP8. *Quart. J. Roy. Meteor. Soc.*, **129**, 373-390.
- Zhang, F., C. Snyder and R. Rotunno, 2002: Numerical prediction of the "surprise" snowstorm of 24-25 January 2000, Part I: Sensitivity to grid resolution and initial state. *Mon. Wea. Rev.*, *.130*, 1617-1632.
- Skamarock, W. C., R. Rotunno and J. B. Klemp, 2002: Catalina eddies and coastally trapped disturbances. *J. Atmos. Sci.*, **59**, 2270-2278.
- Rotunno, R. and R. Ferretti, 2001: Mechanisms of intense alpine rainfall. *J. Atmos. Sci.*, **58**, 1732-1749.
- Welch, W., P. Smolarkiewicz, R. Rotunno, and B. Boville, 2001: The large scale effects of flow over periodic mesoscale topography. *J. Atmos. Sci.*, **58**, 1477-1492.
- Chong, M. and Co-Authors (R. Rotunno), 2000: Real-time wind synthesis from Doppler radar observations during the Mesoscale Alpine Programme. *Bull. Amer. Meteor. Soc.*, **81**, 2953-2962.
- Rotunno, R., D. J. Muraki, and C. Snyder, 2000: Unstable baroclinic waves beyond quasi-geostrophic theory. *J. Atmos. Sci.*, **57**, p. 3285-3295.
- Nuss, W. A. and Co-Authors, 2000: Coastally trapped wind reversals: progress toward understanding. *Bull. Amer. Meteor. Soc.*, **81**, 719-743.
- Ferretti, R., S. Low-Nam, and R. Rotunno, 2000: Numerical simulations of the Piedmont flood of 4-6 November 1994. *Tellus*, **52**, 162-180.
- Weisman, M. L. and R. Rotunno, 1999: On the use of vertical wind shear versus helicity in interpreting supercell dynamics. *J. Atmos. Sci.*, **57**, 1452-1472.
- Braun, S., R. Rotunno, and J. B. Klemp, 1999: On the effects of coastal orography on landfalling cold fronts. Part II: Effect of surface friction. *J. Atmos. Sci.*, **56**, 3366-3384.
- Skamarock, W. C., R. Rotunno, J. B. Klemp, 1999: Models of coastally trapped disturbances. *J. Atmos. Sci.*, **56**, 3349-3365.
- Rotunno, R., V. Grubišić and P. K. Smolarkiewicz, 1999: Vorticity and potential vorticity in mountain wakes, *J. Atmos. Sci.*, **56**, 2796-2810.
- Muraki, D. J., C. Snyder, and R. Rotunno, 1999: The next-order corrections to quasi-

- geostrophic theory. *J. Atmos. Sci.*, **56**, 1547-1560.
- Braun, S., R. Rotunno, and J. B. Klemp, 1999: On the effects of coastal orography on landfalling cold fronts. *J. Atmos. Sci.*, **56**, 517-533.
- Rotunno, R., W. C. Skamarock, and C. Snyder, 1998: Effects of surface drag on fronts within numerically simulated baroclinic waves. *J. Atmos. Sci.*, **55**, 2119-2129.
- Klemp, J. B., R. Rotunno and W.C. Skamarock, 1997: On the propagation of internal bores. *J. Fluid Mech.*, **331**, 81-106.
- Gray, G. H. and R. Rotunno, 1996: Book Review of *International Bibliography of Meteorology: From the Beginning of Printing to 1889*. *Bull. Amer. Met. Soc.*, **77**, 570-573.
- Rotunno, and Co-Authors, 1996: Coastal Meteorology and Oceanography: Report of the third prospectus development team of the U. S. Weather Research Program to NOAA and NSF. *Bull. Amer. Met. Soc.*, **77**, 1578-1585.
- Rotunno, R. and J.-W. Bao, 1996: A case study of cyclogenesis using a model hierarchy. *Mon. Wea. Rev.*, **124**, 1051-1066.
- Skamarock, W. C., J. B. Klemp and R. Rotunno, 1996: The diffraction of Kelvin waves and bores at coastal bends. *J. Atmos. Sci.*, **53**, 1327-1337.
- Emanuel, K. A., and Co-Authors (R. Rotunno), 1995: Report of the first prospectus development team of the U. S. Weather Research Program to NOAA and NSF. *Bull. Amer. Met. Soc.*, **76**, 1194-1208.
- Emanuel, K. A., K. Speer, R. Rotunno, R. Srivastava, and M. Molina, 1995: Hypercanes: A possible link in global extinction scenarios. *J. Geophys. Res.*, **100**, 13,755-13,765. (July)
- Rotunno, R., and P. K. Smolarkiewicz, 1995: Vorticity generation in the shallow-water equations as applied to hydraulic jumps. *J. Atmos. Sci.*, **52**, 320-330.
- Klemp, J. B., R. Rotunno and W.C. Skamarock, 1994: On the dynamics of gravity currents in a channel. *J. Fluid Mech.*, **269**, 169-198.
- Rotunno, R., W. C. Skamarock, and C. Snyder, 1994: An analysis of frontogenesis in numerical simulations of baroclinic waves. *J. Atmos. Sci.*, **51**, 3373-3398.
- Herring, J. R., R. M. Kerr and R. Rotunno, 1994: Ertel's Potential Vorticity in Unstratified Turbulence. *J. Atmos. Sci.*, **51**, 35-47.
- Szoke, E. J. and R. Rotunno, 1993: A comparison of surface observations and visual tornado characteristics for the 15 June 1988 Denver tornado outbreak. *The Tornado: Its Structure, Dynamics, Prediction, and Hazards*. C. Church, D. Burgess, C. Doswell, and R. Davies-Jones, Eds., Geophysical Monograph 79, American Geophysical Union, 353-366.
- Snyder, C., W. C. Skamarock, and R. Rotunno, 1993: Frontal dynamics near and following frontal collapse. *J. Atmos. Sci.* **50**, 3194-3212.
- Rotunno, R., and P. K. Smolarkiewicz, 1991: Further results on lee vortices in low Froude

- number flow. *J. Atmos. Sci.* **48**, 2204–2211.
- Snyder, C., W. C. Skamarock, and R. Rotunno, 1991: A comparison of primitive equation and semi-geostrophic simulations of baroclinic waves in a channel. *J. Atmos. Sci.* **48**, 2179–2194.
- Smolarkiewicz, P. K., and R. Rotunno, 1990: Low Froude number flow past three-dimensional obstacles. Part II: Upwind flow reversal zone. *J. Atmos. Sci.*, **47**, 1498–1511.
- Moeng, C.-H., and R. Rotunno, 1990: Vertical-velocity skewness in the buoyancy-driven boundary layer. *J. Atmos. Sci.*, **47**, 1149–1162.
- Rotunno, R., J. B. Klemp and M. L. Weisman, 1990: Comments on “A numerical investigation of the organization and interaction of the convective and stratiform regions of tropical squall lines.” *J. Atmos. Sci.*, **47** 1031–1033.
- Keyser, D., and R. Rotunno, 1990: On the formation of potential-vorticity anomalies in upper-level jet-front systems. *Mon. Wea. Rev.*, **118**, 1914–1921.
- Thorpe, A. J., and R. Rotunno, 1989: Nonlinear aspects of symmetric instability. *J. Atmos. Sci.*, **46**, 1285–1299.
- Smolarkiewicz, P. K., and R. Rotunno, 1989: Low Froude number flow past three-dimensional obstacles. Part I: Baroclinically generated lee vortices. *J. Atmos. Sci.*, **46**, 1154–1164.
- Smolarkiewicz, P. K., and R. Rotunno, 1989: Reply [to Comment by R. B. Smith]. *J. Atmos. Sci.*, **46**, 3614–3617.
- Rotunno, R. and M. Fantini, 1989: Pettersen’s “Type B” cyclogenesis in terms of discrete, neutral Eady modes. *J. Atmos. Sci.*, **46**, 3599–3604.
- Raymond, D. J., and R. Rotunno, 1989: Response of a stably stratified flow to cooling. *J. Atmos. Sci.*, **46**, 2830–2837.
- Emanuel, K. A., and R. Rotunno, 1989: Polar lows as arctic hurricanes. In *Polar and Arctic Lows*, P. F. Twitchell, E. A. Rasmussen, and K. L. Davidson, Eds., A. Deepak Publishing, 155–177.
- Emanuel, K. A., and R. Rotunno, 1989: Polar lows as arctic hurricanes. *Tellus*, **41A**, 1–17.
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- Weisman, M. L., J. B. Klemp and R. Rotunno, 1988: The structure and evolution of numerically simulated squall lines. *J. Atmos. Sci.*, **45**, 1990–2013.
- Howells, P. A. C., R. Rotunno and R. K. Smith, 1988: A comparative study of atmospheric and laboratory-analogue numerical tornado vortex models. *Quart. J. Royal Meteor. Soc.*, **114**, 801–822.
- Rotunno, R., J. B. Klemp and M. L. Weisman, 1988: A theory for strong long-lived squall lines. *J. Atmos. Sci.*, **45**, 463–485.

- Rotunno, R., and K. A. Emanuel, 1987: An air-sea interaction theory for tropical cyclones. Part II: Evolutionary study using a nonhydrostatic axisymmetric numerical model. *J. Atmos. Sci.*, **44**, 542–561.
- Wilson, T., and R. Rotunno, 1986: Numerical simulation of a laminar end-wall vortex and boundary layer. *Physics of Fluids*, **29**, 3993–4005.
- Fiedler, B. H., and R. Rotunno, 1986: A theory for the maximum windspeeds in tornado-like vortices. *J. Atmos. Sci.*, **43**, 2328–2340.
- Rotunno, R., 1986: Tornadoes and tornadogenesis. In *Mesoscale Meteorology and Forecasting*, P. S. Ray, Ed., Amer. Meteor. Soc., 414–436.
- Rotunno, R., and J. B. Klemp, 1985: On the rotation and propagation of simulated supercell thunderstorms. *J. Atmos. Sci.*, **42**, 271–292.
- Rotunno, R., 1984: An investigation of a three-dimensional asymmetric vortex. *J. Atmos. Sci.*, **41**, 283–298.
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- Rotunno, R., 1983: On the linear theory of the land- and sea-breeze. *J. Atmos. Sci.*, **41**, 1999–2009.
- Rotunno, R., and J. B. Klemp, 1982: The influence of the shear-induced pressure gradient on thunderstorm motion. *Mon. Wea. Rev.*, **110**, 136–151.
- Rotunno, R., 1981: On the evolution of thunderstorm rotation. *Mon. Wea. Rev.*, **109**, 577–586.
- Rotunno, R., 1980: Vorticity dynamics of a convective swirling boundary layer. *J. Fluid Mech.*, **87**, 623–640.
- Rotunno, R., 1979: A study in tornado-like vortex dynamics. *J. Atmos. Sci.*, **36**, 140–155.
- Rotunno, R., 1978: A note on the stability of a cylindrical vortex sheet. *J. Fluid Mech.*, **87**, 761–771.
- Rotunno, R., 1977: Numerical simulation of a laboratory vortex. *J. Atmos. Sci.*, **34**, 1942–1956.
- Rotunno, R., 1977: Internal gravity waves in a time-varying stratification. *J. Fluid Mech.*, **82**, 609–619.
- Rotunno, R., 1976: Trapeze instability modified by a mean shear flow. *J. Atmos. Sci.*, **33**, 1663–1667.

## INVITED CONTRIBUTIONS FOR BOOKS

- Rotunno, R., 2002: Gust Fronts. *Encyclopedia of Atmospheric Sciences*, J. Holton, J. Pyle and J. Curry, Eds., Academic Press.
- National Research Council, 1998: The Atmospheric Sciences: Entering the Twenty-First Century. (R. Rotunno, contributor.) National Academy Press. 364pp.

- Rotunno, R., 1993: Supercell Thunderstorm Modelling and Theory. *The Tornado: Its Structure, Dynamics, Prediction, and Hazards*. C. Church, D. Burgess, C. Doswell, and R. Davies-Jones, Eds., Geophysical Monograph 79, American Geophysical Union, 57-73.
- Rotunno, R, J.A. Curry, C.W. Fairall, C.A.Friehe, W.A. Lyons, J.E. Overland, R.A. Pielke, D.P. Rogers, S.A. Stage, *Coastal Meteorology, A review of the state of the science*, National Academy Press, Washington, D.C., 99pp, 1992.
- Rotunno, R., 1982: On the relation between the thunderstorm updraft and tornado formation. In *Vortex Motion*, H. G. Hornung and E.-A. Müller, Eds., Vieweg & Sohn, Braunschweig, F.R.G., 122–141. (Based on an invited lecture given on the occasion of the 75th anniversary of L. Prandtl's founding of Aerodynamische Versuchsanstalt, Goettingen, November, 1982.)
- Klemp, J. B., and R. Rotunno, 1981: High resolution numerical simulations of the tornadic region within a mature thunderstorm. In *Intense Atmospheric Vortices, Proc., Joint Symposium IUTAM/IUGG*, Reading, U.K., L. Bengtsson and J. Lighthill, Eds., Springer-Verlag, 191–203.
- Rotunno, R., 1981: A numerical simulation of multiple vortices. In *Intense Atmospheric Vortices, Proc., Joint Symposium IUTAM/IUGG*, Reading, U.K., L. Bengtsson and J. Lighthill, Eds., Springer-Verlag, 215–228.