

4 November 2018

CURRICULUM VITAE

NAME: Richard A. Anthes

BIRTHDATE: March 9, 1944

EDUCATION: B.S., University of Wisconsin, 1966
M.S., University of Wisconsin, 1967
Ph.D., University of Wisconsin, 1970

M.S. THESIS: The generation of available potential energy in Hurricane Hilda (1964). University of Wisconsin, Madison, June, 1967, 84 pp.

Ph.D. THESIS: A diagnostic model of the tropical cyclone in isentropic coordinates. University of Wisconsin, Madison, 1970, 184 pp.

PROFESSIONAL EXPERIENCE:

Jan 2012 – present	President Emeritus, University Corporation for Atmospheric Research (UCAR), Boulder, CO
Sept 1988 – Jan 2012	President, UCAR, Boulder, Colorado
Mar 1988 -Sept 1988	Acting President, UCAR
Sept 1986 - Feb 1988	Director, National Center for Atmospheric Research (NCAR), Boulder, Colorado
Sept 1981 - Aug 1986	Director, Atmospheric Analysis and Prediction Division, National Center for Atmospheric Research, Boulder, Colorado
Sept 1978 - Aug 1981	Professor, The Pennsylvania State University, University Park, Pennsylvania
Sept 1977 - Aug 1978	Research Professor, Naval Postgraduate School, Monterey, California
1971 - Aug 1977	Assistant and Associate Professor, The Pennsylvania State University
1968 - 1971	Research Meteorologist, NOAA, National Hurricane Research Laboratory
1966 - 1968	National Science Foundation (NSF) Fellow, University of Wisconsin
1962 - 1967 (summers)	Student Trainee, U.S. Weather Bureau, ESSA, NOAA

HONORS

Honorary Member of the American Meteorological Society, 2015
President, American Meteorological Society (AMS), 2007
Winner, China's Friendship Award, 2003. (Highest award presented to foreigners by the People's Republic of China and the first atmospheric scientist ever to receive this award)

Elected Fellow, American Geophysical Union (AGU), 2001
American Meteorological Society Jule G. Charney Award, 1987
American Meteorological Society Clarence L. Meisinger Award, 1980
Elected Fellow, American Meteorological Society, 1979

FURTHER PROFESSIONAL EXPERIENCE:

Member Board of Directors of Global Weather Corporation, 2012-present
Chairman, NOAA Space Platform Requirements Working Group, 2015-2018.
Member of Board of Directors of Harry Otten Foundation (2011-2015) and Chair, 2014-2017.
Member Board of Directors of UNAVCO, 2011-2015
Member AMS Nominating Committee, 2012-2014, Chair 2014.
Member UCAR SOARS Steering Committee, 2012-2018.
Member, Committee on the Assessment of NASA's Earth Science Program, National Research Council (NRC), 2010-2012
Member, NRC Space Studies Board, 2008-2011
Member, Global Positioning System (GPS) Scientific Application Research Center, National Central University, Taiwan, 2006-2014
Co-Chairman (with Berrien Moore), NRC decadal study "Earth Sciences: Committee on Earth Science and Applications from Space" (2004-2007)
National Associate, National Academies, 2002 (in recognition of extraordinary service to the National Academies of the NRC)
Vice Chairman, NRC "Committee on Partnerships in Weather and Climate Services" (2001-2003)
Chairman, NRC Committee on "NASA-NOAA Transition from Research to Operations (CONNTRO)" (2001-2003)
Member, Naval Oceanographic Partnership Program's Ocean Research Advisory Panel (1998-2002)
Vice-Chair, Chinese Meteorological Agency Climate Consultancy and Appraisal Committee (1997-2000)
Member, Environment Canada's Science and Technology Advisory Board (1996-2005)
Chairman, NRC National Weather Service Modernization Committee (1996-1999)
Member, Natural Sciences and Engineering Research Council of Canada, Scientific Advisory Panel for Dalhousie University (1995-present)
Member, Lawrence Livermore National Laboratory, Scientific Advisory Committee, Earth and Environmental Sciences Directorate (1993-2005)
Member, NRC National Weather Service Modernization Committee (1993-1996)
Ex officio member, Executive Committee of the Board of Ocean and Atmospheres of the National Association of State Universities and Land-Grant Colleges (NASULGC) (1992-2000)
Member, NRC Committee on Environmental Research (1991-1993)
External Examiner, Department of Meteorology, University of Nairobi (1988-1991)
Member, Advisory Committee, Supercomputer Institute at Florida State University (1987-1989)
Chairman, NRC Board on Atmospheric Sciences and Climate (1986-1989)
Councilor, AMS (1986-1989)
Member, Naval Advisory Research Committee (1986-1988)
Member, National Aeronautics and Space Administration (NASA), Laser Atmospheric Wind Sounder Working Group (1986-1988)
Member, NRC Geophysics Study Committee (1985-1988)
Member, NRC Committee for the Study of the Nation's Weather Observations Systems (1985-1987)
Chairman, Committee on Science, Engineering, and Public Policy (COSEPUP); Research Briefing Panel on Weather Prediction Technologies (1985)
Member, World Scientific Publishing Company, International Advisors Board in Meteorology and Oceanography (1984-2010)
Chairman, National Oceanic and Atmospheric Administration (NOAA), Profiler Advisory Committee (1984-1987)
Associate Editor, *Monthly Weather Review* (1984-1986)
Chairman, NRC Board on Atmospheric Sciences and Climate, Panel on Mesoscale Research (1984-1986)

Associate Editor, *Journal of the Atmospheric Sciences* (1983-1986)
Member, NRC Space Science Board, Committee on Earth Sciences (1982-1984)
Member, SESAME Council (1982-1984)
Member, AMS Awards Committee (1982)
Member, NRC Research Briefing Panel on Atmospheric Sciences" for the Office of Science and Technology Policy (1982)
Member, Editorial Board, D. Reidel Publishing Co. (1981-1986)
Member and Editor, Scientific Program Report, UCAR Steering Committee for the National STORM Program (1981-1985)
Chairman, NRC Panel on Mesoscale Processes (1980-1981)
Member, NRC Committee on Atmospheric Sciences (1978-1981)
Chairman, NRC Panel on Precipitation Processes (1978-1980)
Member, U.S. Committee for the Global Atmospheric Research Program (USC-GARP) (1978-1979)
Chairman, NCAR Scientific Programs Evaluation Committee (1977-1978)
Chairman, NCAR Review Committee for Small-Scale Analysis Project (1977)
Member, AMS' Committee on Hurricanes and Tropical Meteorology (1976-1978)
Member, NOAA, Task Group on the Rossby Effect in Project STORMFURY (1976)
Member, NRC STORMFURY Panel of the Committee on Atmospheric Sciences (1975-1982)

CONSULTING EXPERIENCE:

Public Service Company of Colorado, Denver
Atmospheric Sciences Laboratory, White Sands Missile Range
Air Environment, Canada
Bradford Coal Company, Pennsylvania
Environmental Protection Agency
National Weather Service
Institute for Atmospheric Optics and Remote Sensing
Science and Technology Corporation

STUDENTS (ALL PENN STATE EXCEPT THERESE RIECKH)

PhD

1. John Diercks, 1975: Generation, Propagation, and Maintenance of Spiral Bands in Linear and Nonlinear Hurricane Models.
2. Thomas T. Warner (deceased, 1944-2011), 1976: The Initial Growth of Data-Related Errors in Mesoscale Numerical Weather Prediction Models.
3. James E. Hoke, 1976: Initialisation of models for numerical weather prediction by a dynamic-initialisation technique.
4. Joseph P. Sobel, 1976: Nested grids in numerical weather prediction and an application to a mesoscale jet streak.
5. Donald Perkey, 1976: Prediction of convective activity using a system of parasitic nested numerical models (co-advisor with John Hovermale)
6. Simon Chang, 1977: The mutual response of the tropical cyclone and the ocean as revealed by an interacting atmospheric and oceanic model.
7. Nelson L. Seaman, 1977: The Development of a Mesoscale Semi-implicit Numerical Model.
8. Daniel Keyser, 1981: Frontogenesis in the planetary boundary layer of an amplifying, two-dimensional baroclinic wave.
9. Ying-Hwa (Bill) Kuo, 1983: A diagnostic case study of the effects of deep extratropical convection on the large-scale temperature and moisture structure.
10. Eirh-Yu Hsie, 1983: Frontogenesis in a moist atmosphere.
11. Peter G. Black, 1983: Ocean temperature change induced by tropical cyclones.

12. Therese Rieckh, 2018: Investigating the value of GPS radio occultation water vapor data using in-situ and remote sensing techniques and models (University of Graz, Austria, co-advisor with Ulrich Foelsche).

M.S.

1. Paul Allan Eisen, 1972: A Mesoscale Study of the Oklahoma Squall Line of 8 and 9 June 1966
2. Russell Sinclair, 1972: Variation of the low level winds during passage of a thunderstorm gust front.
3. Ed O'lenic, 1976: Mesoscale Interactions Between a Cold Front and the Planetary Boundary Layer.
4. Dan Keyser, 1977: Sensitivity tests and a real-data forecast for the planetary boundary layer using a mixed-layer model.
5. Gary D. Fried deceased (1953-2008) 1978: Introducing Subsynoptic scale perturbations into a primitive equation forecast model (co-advisor with John Cahir)
6. Michael Fiorino 1978: The incorporation of satellite-sensed surface winds into the real-data initialization of a mesoscale hurricane model.
7. Richard Shaginaw, 1979: Effects of Planetary Boundary-Layer Formulation On a Subsynoptical-Scale Numerical Forecast.
8. Richard Burkhart, 1980: Subsynoptic Scale Processes leading to the Development of Severe Weather in the Vicinity of an Upper Level Jet Streak.
9. Douglas L. Westphal, 1981: The interaction between radiative and boundary layer processes in stratus clouds.
10. Nancy Norton, 1980: Comparison of Finite Element and Finite Difference Solutions of a Planetary Boundary Layer Model.
11. Da-Lin Zhang, 1982: A verification of one-dimensional model simulation of the planetary boundary layer over dry and moist terrain.
12. Daniel G. Baldwin, 1983, The Effect of Diabatic and Frictional Processes on Frontal Circulations.

PUBLICATIONS (REFEREED JOURNALS):

Gilpin, S., R. Anthes, and S. Sokolovskiy, 2018b: Sensitivity of forward-modeled bending angles to vertical interpolation of refractivity for radio occultation data assimilation. Accepted by *Mon. Wea. Rev.*

Rieckh, T. and R.A. Anthes, 2018: Evaluating two methods of estimating error variances using simulated data sets with known errors. *Atmos. Meas. Tech.*, <https://doi.org/10.5194/amt-2018-75>

Gilpin, S., T. Rieckh and R.A. Anthes, 2018a: Reducing representativeness and sampling errors in radio occultation-radiosonde comparisons. *Atmos. Meas. Tech.*, 11, 2567–2582, 2018
<https://doi.org/10.5194/amt-11-2567-2018>.

Anthes, R.A. and T. Rieckh, 2018: Estimating observation and model error variances using multiple data sets. *Atmos. Meas. Tech. Discuss.* 11, 4239–4260, 2018. <https://doi.org/10.5194/amt-11-4239-2018>

Rieckh, T., R. Anthes, W. Randel, S.-P. Ho and U. Foelsche, 2018: Evaluating tropospheric humidity from GPS radio occultation, radiosonde, and AIRS from high-resolution time series. *Atmos. Meas. Tech.*, 11, 3091-3109, <https://doi.org/10.5194/amt-11-3091-2018>

Ho, S.-P. L. Peng, C. Mears and R.A. Anthes, 2018: Comparison of global observations and trends of total precipitable water derived from microwave radiometers and COSMIC radio occultation from 2006 to 2013. *Atmos. Chem. Phys.*, 18, 259-274.

Stephens, Pamela and Richard A. Anthes, 2017: Jay Fein Obituary, *Bull. American Meteor. Soc.*, 98, 393-396

Anthes, R.A., L. Uccellini and J. Stremikis, 2017: Donald R. Johnson Obituary, *Bull. American Meteor. Soc.*, 98, 1514-1517. July edition.

Rieckh, Therese, Richard Anthes, William Randel, Shu-Peng Ho, and Ulrich Foelsche, 2017: Tropospheric dry layers in the tropical western Pacific: comparisons of GPS radio occultation with multiple data sets. *Atmos. Meas. Tech.*, **10**, 1093-1110. doi:10.5194/amt-10-1093-2017.

Anthes, Richard; Alan Robock, Juan Carlos Antuña-Marrero, Oswaldo García, John J. Braun and René Estevan Arredondo, 2015: Cooperation on GPS-Meteorology between the United States and Cuba. *Bull. Amer. Meteorol. Soc.*, **96**, 1079-1088, doi:10.1175/BAMS-D-14-00171.1.

Cucurull, L. and R.A. Anthes, 2015: Impact of loss of U.S. microwave and radio occultation observations in operational numerical weather prediction in support of the U.S. data gap mitigation activities. *Wea. and Forecasting*, **30**, 255-269.

Yue, X., W.S. Schreiner, N. Pedatella, R.A. Anthes, A.J. Mannucci, P.R. Strauss and J.-Y. Liu, 2014: Space weather observations by GNSS radio occultation from FORMOSAT-3/COSMIC to FORMOSAT-7/COSMIC-2. *Space Weather Quarterly*, **11**, 14-19, doi:10.1002/2014SW001133.

Ho, Shu-peng; Liang Peng, Richard A. Anthes, Ying-Hwa Kuo, and Hsiao-Chun Lin, 2015: Marine Boundary Layer Heights and their Longitudinal, Diurnal and Inter-seasonal Variability in the Southeast Pacific using COSMIC, CALIOP, and Radiosonde Data. *J. Climate*, **28**, 2856-2872.

Cucurull, L. and R. Anthes, 2014: Impact of Infrared, Microwave and Radio Occultation Satellite Observations on Operational Numerical Weather Prediction. *Mon. Wea. Rev.*, **142**, 4164-4186..

Cucurull, L., R. Anthes and L.-L. Tsao. 2014: Radio Occultation Observations as Anchor Observations in Numerical Weather Prediction Models and Associated Reduction of Bias Corrections in Microwave and Infrared Satellite Observations. *J. Atmos. Oceanic Tech.*, **31**, 20-30.

Anthes, R.A., 2014: Operational Transition. Article in *Encyclopedia for Remote Sensing*. Ed. Eni G. Njoku, Springer, Dordrecht, Netherlands, 939 pp.

Anthes, R. A., 2011: Exploring Earth's atmosphere with radio occultation: contributions to weather, climate and space weather, *Atmos. Meas. Tech.*, **4**, 1077-1103, doi:10.5194/amt-4-1077-2011.

Lin, L., X. Zou, R. Anthes and Y.-H. Kuo, 2010: COSMIC GPS Radio Occultation Temperature Profiles in Clouds. *Mon. Wea. Rev.*, **138**. DOI: 10.1175/2009MWR2986.1.

Shapiro, M., J. Shukla, G. Brunet, C. Nobre, M. Béland, R. Dole, K. Trenberth, R. Anthes, G. Asrar, L. Barrie, P. Bougeault, G. Brasseur, D. Burridge, A. Busalacchi, J. Caughey, D. Chen, J. Church, T. Enomoto, B. Hoskins, Ø. Hov, A. Laing, H. Le Treut, J. Marotzke, G. McBean, G. Meehl, M. Miller, B. Mills, J. Mitchell, M. Moncrieff, T. Nakazawa, H. Olafsson, T. Palmer, D. Parsons, D. Rogers, A. Simmons, A. Troccoli, Z. Toth, L. Uccellini, C. Velden and J. M. Wallace, 2010: An Earth-system Prediction Initiative for the 21st Century. *Bull. Amer. Meteor. Soc.*, **91**. 1377-1387.

AMS Council, 2009: The 2009 AMS Member Survey – A Summary of Findings and Response to Members. *Bull. Amer. Meteor. Soc.*, **91** (to appear in May 2010 issue).

Anthes, R.A., P.A. Bernhardt, Y. Chen, L. Cucurull, K.F. Dymond, D. Ector, S.B. Healy, S.P. Ho, D.C. Hunt, Y.-H. Kuo, H. Liu, K. Manning, C. McCormick, T.K. Meehan, W.J. Randel, C. Rocken, W.S. Schreiner, S.V. Sokolovskiy, S. Syndergaard, D.C. Thompson, K.E. Trenberth, T.K. Wee, N.L. Yen, and Z. Zeng, 2008: The COSMIC/FORMOSAT-3 Mission: Early Results. *Bull. Amer. Met. Soc.*, **89**, 313-333.

Sokolovskiy S., Y.-H. Kuo, C. Rocken, W. Schreiner, D. Hunt, R. A. Anthes, 2007: Reply to comment by A. von Engel et al. on “Monitoring the atmospheric boundary layer by GPS radio occultation signals recorded in the open-loop mode”, *Geophys. Res. Lett.*, **34**, L02807, doi:10.1029/2006GL028497.

Sokolovskiy, S.V., C. Rocken, D.H. Lenschow, Y.-H. Kuo, R.A. Anthes, W.S. Schreiner and D.C. Hunt, 2007: Observing the moist troposphere with radio occultation signals from COSMIC. *Geophys. Res. Lett.*, **34**, L18802, doi:10.1029/2007GL030458.

Pandya, R. E., Henderson, S. Henderson, R. A. Anthes, and R. M. Johnson, 2007: BEST Practices for Broadening Participation in the Geosciences: Strategies from the UCAR Significant Opportunities in Atmospheric Research and Science (SOARS) Program, *Jour. Geoscience Education*, **55** (6), 500-506.

Cheng, C.-Z., Y.-H. Kuo, R.A. Anthes, and L. Wu, 2006: Satellite constellation monitors global and space weather. *EOS, Trans. Amer. Geophys. Union*, **87**, 166-67

Anthes, R.A., R.W. Corell, G. Holland, J.W. Hurrell, M.C. MacCracken, and K.E. Trenberth, 2006: Hurricanes and global warming – Potential linkages and consequences. *Bull. Amer. Met. Soc.*, **87**, 623-628.

Zhang, Q.-H., S.-J. Chen, Y.-H. Kuo, K.-H. Lau, and R.A. Anthes, 2005: Numerical study of a typhoon with a large eye: Model simulation and verification. *Mon. Wea. Rev.*, **133**, 725-742.

Anthes, R.A., Y.-H. Kuo, and C. Rocken, 2005: The role of GPS radio occultation observations in the global observing system for weather and climate. Proceedings of The First THORPEX International Science Program, 6-10 December 2004, Montreal, Canada. WMO.

Anthes, R.A., 2004: Global weather services in 2025 – A five-year update. *Bulletin of the World Meteorological Organization*, **53**, No. 3, July, pp. 227-231

Anthes, R.A., G. Elgered, Y.-H. Kuo, T. Tsuda, Y. Hatanaka, T. Satomura, T. Nakazawa, K. Aonashi, H. Seko, and H. Nakamura (Co-editors), 2004: Application of GPS remote sensing to meteorology and related fields. Special Issue of the *J. Meteor. Soc. Japan*, **82**, No. 1B, 596 pp.

Kuo, Y.-H., C. Rocken, and R.A. Anthes, 2004: Applications of GPS radio occultation data to weather and climate and the COSMIC mission. *American Institute of Aeronautics and Astronautics*, 9 pp.

Kuo, Y.-H., T.-K. Wee, S. Sokolovskiy, C. Rocken, W. Schreiner, D. Hunt, and R.A. Anthes, 2004: Inversion and error estimation of GPS radio occultation data. *J. Meteor. Soc. Japan* special issue, **84**, No. 1B, 507-531.

Windham, T.L., A. J. Stevermer, and R.A. Anthes, 2004: SOARS – An overview of the program and its first 8 years. *Bull. Amer. Met. Soc.*, **85**, 42-47.

Zou, X., H. Liu, R.A. Anthes, H. Shao, J.C. Chang, and Y.-J. Zhu, 2004: Impact of CHAMP radio occultation observations on global analysis and forecasts in the absence of AMSU radiance data. *J. Meteor. Soc. Japan* special issue, **84**, No. 1B, 533-549.

Anthes, R.A., Y.-H. Kuo, and C. Rocken, 2003: Constellation Observing System for Meteorology, Ionosphere and Climate (COSMIC). Published by the Society of Photo-optical Instrumentation Engineers (SPIE) in the Proceedings of the Third International Asia-Pacific Symposium on Remote Sensing of the Atmosphere, Ocean, Environment, and Space, 23-27 October 2002, Hangzhou, China.

Anthes, R.A., Y.-H. Kuo, C. Rocken, and W.S. Schreiner, 2003: Atmospheric sounding using GPS radio occultation. *MAUSAM —Quarterly Journal of Meteorology, Hydrology and Geophysics (INDIA)*, **54**,1, 25-38.

- Bengtsson, L., G. Robinson, R. Anthes, K. Aonashi, A. Dodson, G. Elgered, G. Gendt, R. Gurney, M. Jietai, C. Mitchell, M. Mlaki, A. Rhodin, P. Silverstrin, R. Ware, R. Watson, and W. Wergen, 2003: The use of GPS measurements for water vapor determination. *Bull. Amer. Met. Soc.*, **84**, 1249-1258.
- UCAR, 2003: Workshop on Earth System Observations. Smithsonian Institution, Washington D.C., August 13-15, 2003.
- Vali, G. and R. Anthes, 2003: On the supply and demand for atmospheric sciences professionals. *Bull. Amer. Met. Soc.*, **84**, 1163-64.
- Anthes, R.A. and Y.-H. Kuo, 2002: Summary of COSMIC and applications to meteorology and climate. East Asia and Western Pacific Meteorology and Climate- Selected Papers of the Fourth Conference, Hangzhou, 26-28 October 1999. **World Scientific Series on Meteorology of East Asia-Vol. 1**. World Scientific Publishing Co., Singapore, 91-107.
- Vali, G., R. Anthes, D. Thomson, D. Houghton, J. Fellows, and S. Friberg, 2002: Wanted: More Ph.D.s – Graduate enrollments in the atmospheric sciences. *Bull. Amer. Met. Soc.*, **83**, 1, 63-71.
- Zou, X., H. Liu, and R. A. Anthes, 2002: A statistical summary of errors in the calculation of radio-occultation bending angles caused by a 2D approximation of ray tracing and the assumption of spherical symmetry of the atmosphere. *J. Atmos. and Oceanic Tech.*, **19**, 51-64.
- Anthes, R., O. Brown, K. Droegemeier, and J. Fellows, 2001: UCAR and NCAR at 40. *Bull. Amer. Met. Soc.*, **82**, 6, 1139-1149.
- Anthes, R., J. Fellows, B. Hooke, and R. McPherson, 2001: AMS/UCAR outreach to the Bush Administration and the 107th Congress. *Bull. Amer. Met. Soc.*, **82**, 987-994.
- Liu, H., X. Zou, R. A. Anthes, J.C. Chang, J.-H. Tseng, and B. Wang, 2001: The impact of 837 GPS/MET bending angle profiles on assimilation and forecasts for the period June 20-30, 1995. *J. Geophys. Res.*, **106**, 31,771-31,786.
- Anthes, R.A., C. Rocken, and Y.-H. Kuo, 2000: Applications of COSMIC to meteorology and climate. Special issue of *Terrestrial, Atmospheric and Oceanic Sciences (TAO)*, **11**, 115-156.
- Kuo, Y.-H., S. Sokolovskiy, R. Anthes, and F. Vandenberghe, 2000: Assimilation of GPS radio occultation data for numerical weather prediction. Special issue of *Terrestrial, Atmospheric and Oceanic Sciences (TAO)*, **11**, 157-186.
- Zou, X., B. Wang, H. Liu, R.A. Anthes, T. Matsumura, and Y.-J. Zhu, 2000: Use of GPS/MET refraction angles in three-dimensional variational analysis. *Q. J. R. Met. Soc.*, **126**, pp. 3013-3040.
- Zou, X., F. Vandenberghe, B. Wang, M.E. Gorbunov, Y.-H. Kuo, S. Sokolovskiy, J.C. Chang, J.G. Sela, and R. A. Anthes, 1999: A ray-tracing operator and its adjoint for the use of GPS/MET refraction angle measurements. *J. Geophys. Res.*, **104**, D18, 22,301-22,318, Sept. 27, 1999.
- Anthes, R., M. Exner, and Y.-H. Kuo, 1998: GPS sounding of the atmosphere from Low Earth Orbit: Preliminary results and potential impact on numerical weather prediction. Proceedings of the 3d International Conference on East Asia and Western Pacific Meteorology and Climate, 16-18 May 1996, Chungli, Taiwan. Ed. C.P. Chang, J.C.L Chan, and J.T Wang. World Scientific Publishing Co., Singapore, p. 17-26 (562 pp. total in book).
- Kuo, Y.-H., X. Zou, S.J. Chen, W. Huang, Y.-R. Guo, R.A. Anthes, M. Exner, D. Hunt, C. Rocken, and S. Sokolovskiy, 1998: A GPS/MET sounding through an intense upper-level front. *Bull. Amer. Met. Soc.*, **79**, 617-626.

Anthes, R., M. Exner, C. Rocken, and R. Ware, 1997: Results from the GPS/MET experiment and potential applications to GEWEX. *GEWEX/WCRP News*, **7**, 1, 3-6.

Rocken, C., R. Anthes, M. Exner, D. Hunt, S. Sokolovskiy, R. Ware, M. Gorbunov, W. Schreiner, D. Feng, B. Herman, Y.-H. Kuo, and X. Zou, 1997: Analysis and validation of GPS/MET data in the neutral atmosphere. *J. Geophys. Res.*, **Vol. 102**, D25, 29,849-29866.

Businger, S., S. Chiswell, M. Bevis, J. Duan, R. Anthes, C. Rocken, R. Ware, M. Exner, T. VanHove, and F. Solheim, 1996: The promise of GPS in atmospheric monitoring. *Bull. Amer. Met. Soc.*, **77**, 1, 5-18.

Ware, R., M. Exner, D. Feng, M. Gorbunov, K. Hardy, B. Herman, Y. Kuo, T. Meehan, W. Melbourne, C. Rocken, W. Schreiner, S. Sokolovskiy, F. Solheim, X. Zou, R. Anthes, S. Businger, and K. Trenberth, 1996: GPS sounding of the atmosphere from Low Earth Orbit: Preliminary results. *Bull. Amer. Met. Soc.*, **77**, No. 1, 19-40.

Anthes, R.A., 1994: UCAR response to the report of the ad hoc committee on international data exchange. *Bull. Amer. Met. Soc.*, **75**, 1849-1854.

Bevis, M., S. Businger, S. Chiswell, T. A. Herring, R.A. Anthes, C. Rocken, and R. H. Ware, 1994: GPS meteorology: Mapping zenith wet delays onto precipitable water. *J. Applied Met.*, **33**, No. 3, 379-386.

Anthes, R.A., 1993: The global trajectory. *Bull. Amer. Met. Soc.*, **74**, No. 6, 1121-1130.

Yuan, L., R. A. Anthes, R. H. Ware, C. Rocken, W. D. Bonner, M. Bevis, and S. Businger, 1993: Sensing climate change using the Global Positioning System. *J. Geophys. Res.-Atmospheres*, **98**, No. D8, 14,925-14,937.

Anthes, R. A., F. P. Bretherton, and D. S. Schimel, 1992: Climate System Modeling Program. Preprint volume of the Third Symposium on Global Change Studies, January 5-10, 1992, Atlanta, GA. Published by the American Meteorological Society.

Bevis, M., S. Businger, T. A. Herring, C. Rocken, R. A. Anthes, and R. H. Ware, 1992: GPS meteorology: Remote sensing of atmospheric water vapor using the Global Positioning System. *J. Geophys. Res.-Atmospheres*, **97**, No. D14, 15,787-15,801.

Yuan, L., R. A. Anthes, R. H. Ware, and W. D. Bonner, 1992: Using the Global Positioning System in atmospheric sciences and for detecting climate change. Presented at the 2nd International Conference on East Asia and Western Pacific Meteorology and Climate, September 7-10, 1992, Hong Kong.

Anthes, R. A., 1990: Recent applications of the Penn State/NCAR Mesoscale Model to synoptic, mesoscale and climate studies. *Bull. Amer. Met. Soc.*, **71**, (11), 1610-1629.

Anthes, R. A., Y.-H. Kuo, E.-Y. Hsie, S. Low-Nam, and T. W. Bettge, 1989: Estimation of skill and uncertainty in regional numerical models. *Q. J. R. Met. Soc.*, **115**, 763-806.

Anthes, R. A. and Zhou Xiuji, 1989: Meeting Review: Joint U. S.-P. R. C. Workshop on Mesoscale Meteorology, 5-7 Sept. 1988, Beijing, P. R. C., *Bull. Amer. Met. Soc.*, **70**, 628-631.

Yan, H. and R. A. Anthes, 1988: The effect of variations in surface moisture on mesoscale circulations. *Mon. Wea. Rev.*, **116**, 192-208.

Anthes, R. A. and C.-Y. Tsay, 1987: Summary of an international conference on monsoon and mesoscale meteorology, 4-7 November 1986, Taipei. *Bull. Amer. Met. Soc.*, **68**, 356-357.

- Forbes, G. S., R. A. Anthes, and D. W. Thomson, 1987: Synoptic and mesoscale aspects of an Appalachian ice storm associated with cold-air damming. *Mon. Wea. Rev.*, **115**, 564-591.
- Nuss, W. and R. A. Anthes, 1987: A numerical investigation of low-level processes in rapid cyclogenesis, *Mon. Wea. Rev.*, **115**, 2728-2743.
- Tribbia, J. J. and R. A. Anthes, 1987: Scientific basis of modern weather prediction. *Science*, **31**, 493-499.
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