

RESUME

Patrick J. Michaels

Route 1, Box 234 B
Waynesboro, Virginia 22980

(b)(6)

EDUCATION

A.B. Biological Sciences, 1971, University of Chicago

S.M. Biology, 1975, University of Chicago

Ph.D. Special Graduate Committee on Ecological Climatology,
1979, University of Wisconsin-Madison

Dissertation: Atmospheric Anomalies and Crop Yields in North America

PROFESSIONAL EXPERIENCE (Abbreviated)

Center for Climatic Research, University of Wisconsin, 1976-1979

Developed and tested a new family of crop yield/climate models for small grains in the United States, India and Mexico.

Department of Environmental Sciences

University of Virginia

Assistant Professor, 1980-1986

Associate Professor, 1986-present

Appointed Virginia State Climatologist by Governor

John Dalton, July, 1980.

PROFESSIONAL SOCIETIES

Sigma Xi, The Scientific Honor Society

American Meteorological Society

(President, Central Virginia Chapter, 1986-87)

(Program Chair, Committee on Applied Climatology)

American Association for the Advancement of Science

American Association of State Climatologists

(President, 1987-88; Executive Board, 1986-89)

COURSES OF INSTRUCTION

EVSC 100A: The Greenhouse Effect and Public Policy

EVSC 447: Climatological Analysis

EVAT 796: Advanced Climatology

ACADEMIC COMMITTEE SERVICE (Major Professor Only)

David Stooksbury (PhD)
Paul J. Knappenberger (MS)
Harry Lins (PhD)

GOVERNMENT ADVISORY SERVICE

Governor's Inquiry--1980 drought
Governor's Inquiry--1981 drought
Virginia Farm Bureau--1983 drought
Virginia Department of Agriculture and Consumer
Services--Avian Influenza, 1983-4
Virginia Air Pollution Control Board--Acid Precipitation, 1984-1987
Governor's Task Force the Disposal of High-Level
Nuclear Waste, 1986.
Governor's Task Force on Drought, 1986
Virginia Office of Economic Development, 1986-7
Virginia Film Office, 1986
Virginia Division of Forestry, 1982-1987
Virginia Water Resources Research Center, 1986
U.S. Environmental Protection Agency Global Change
Initiative, 1987
U.S. Geological Survey, 1988

INVITED LECTURES AND TESTIMONY

Environmental Sciences Departmental Seminar, 1980, 1986
New Mexico State University, 1981
Virginia Farm Bureau, 1981, 1982, 1983
Virginia Small Grains Conference, 1981, 1988
Environmental Sciences Undergraduate Seminar, 1982, 1983, 1987
Sigma Xi, University of Virginia, 1982
Economics Honor Society, J. Madison University, 1983
Colorado State University, Atm. Sci. Dept. Seminar 1983
Virginia Tech Short Course on Viticulture, 1984
American Meteorological Society, Central Virginia Chapter, 1984
National Academy of Sciences, Commission on Life Life Sciences, 1985
Environmental Sciences Undergraduate Seminar, 1985
University of Virginia Institute of Government, 1985
University of Virginia Blandy Experimental Farm, 1986
Virginia Mosquito Control Commission, 1986
Virginia Water Resources Research Center, 1986 (2), 1988
Virginia Air Pollution Control Board, 1986
Virginia Tech Extension Service, 1987, 1988
Cooperative Institute for Research in the Atmosphere, Colorado State University, 1987
Virginia Agricultural Chemical and Soil Fert. Assn. 1988
U.S. Geological Survey, Advisory Committee on Water Data, 1988

University of Delaware, Geography Dept. Seminar 1988
 Moderator, U.S. Drought Symposium, The Weather Channel, 1988
 U.S. National Climate Program, Panel on Climate Trends, 1988
 Lynchburg College Special Lecture, 1988
 Sigma Xi, U.S. Department of Energy, 1988
 American Society of Chemical Engineers, 1988
 South Carolina Water Resources Commission, 1988
 Virginia Mathematics and Science Center, 1988
 Scripps Institute of Oceanography, 1988
 Virginia State Air Pollution Control Board, 1989
 Virginia State Feed Association, 1989
 U.S. House of Representatives, Subcommittee on Energy and Power, 1989
 Brookings Institution, 1989
 American Society of Civil Engineers, 1989
 Federal Executive Institute Alumni Association, 1989
 Executive Board, National Coal Association, 1989
 U.S. Senate, Committee on Foreign Relations, 1989
 U.S. Department of State, Foreign Service Institute, 1989
 Virginia Department of Agriculture and Consumer Services, 1989
 National Association of Home Builders, 1989
 American Meteorological Society, Committee on Broadcast Meteorology, 1989
 Georgia and North Carolina Textile Manufacturing Association, 1989
 The Eris Society, Aspen, Colorado, 1989
 University of Texas, Conference on Energy Futures, 1989
 Western Fuels Association Annual Meeting, 1989
 7th International Pittsburg Coal Conference, 1989
 U.S. Department of State, Seminar on Current Affairs, 1989
 Edison Electric Institute, 1989
 Virginia Soil and Water Conservatio Association, 1989
 University of Illinois, Annual Energy Conference, 1989
 The Keystone Center, Washington DC, 1989
 National Governor's Conference, United Nations, 1989
 Basin Electric Power Cooperative, Bismark ND, 1989
 Bennington College, Bennington in New York Seminar, 1989
 Virginia Tech Turkey Days (I), 1989
 North Carolina State University MEAS Seminar, 1990
 Illinois Power Corporation, 1990
 Georgia Southern University, Conference on Global Issues, 1990
 Virginia Division of Forestry, 1990
 West Richmond Businessmen's Association, 1990
 Southeastern Climate Symposium, Charleston SC, 1990
 American Meteorological Society, Washington DC, 1990
 Virginia Council on the Environment/Virginia Education Association, 1990
 American Meteorological Society, Richmond VA, 1990
 Department of Environmental Sciences Undergraduate Seminar, 1990
 Virginia Mathematics and Science Center, 1990
 Missouri Governor's Conference on Natural Resources, 1990

Consumer Alert, National Press Club, 1990
Virginia Emergency Services Conference on Severe Weather, 1990
North Carolina Coal Institute, 1990
The Brookings Institution, 1990
Pacific Research Institute, 1990
Virginia Soil and Water Conservation Association, 1990
American Association of State Climatologists, 1990
Grand Rounds, Western State Hospital, 1990
Penn Ag Industries Annual Meeting, 1990
Kentucky Coal Operators Association, Pikeville KY, 1990
Council of Industrial Boiler Owners, Orlando FL, 1990
Chemical Manufacturers Association, Washington DC, 1990
Maryland Chemical Industry Council, Baltimore MD, 1990
American Water Resources Association, Denver CO, 1990
Hillsdale College, 1990
National Coal Association, Washington DC, 1990

PUBLICATIONS

Senior Author unless otherwise noted

1977. A Predictive Model for Wheat Yield in Sonora, Mexico. University of Wisconsin, Institute for Environmental Studies, Report #73. University of Wisconsin-Madison, 53706. 17pp.
1977. An Aggregated National Model for Wheat Yield in India. University of Wisconsin, Institute for Environmental Studies, Report #74. University of Wisconsin--Madison, 53706. 17pp.
1978. A Predictive Model for Winter Wheat Yield in the U.S. Great Plains. University of Wisconsin, Institute for Environmental Studies, Report #94. University of Wisconsin-Madison, 53706. 44pp.
1979. A Simple Large Area Crop/Climate Model for United States Winter Wheat. American Meteorological Society, 14th Conf. on Agric. and For. Meteor., Amer. Met. Soc., Boston Mass. pp64-67.
1981. The Climatic Sensitivity of 'Green Revolution' Wheat Culture in Sonora, Mexico, *Envi. Conserv.* Vol.8, 307-312.
1981. Virginia's Climate. University of Virginia News Letter, Vol. 57, no.5, 17-20. (with B.P. Hayden, Senior Author)
1981. Comparison of the Climatic Sensitivity of "Green Revolution" Wheat Culture to that in the United States Great Plains. American Meteorological Society, 15th Conf. on Agric. and For. Meteor., Amer. Met. Soc., Boston, Mass. pp106-109.
1982. The Response of the 'Green Revolution' to Climatic Variability. *Cl. Change*, Vol. 4., 255-271.

1982. Five Tropical Systems on Similar Tracks. *Mon. Wea. Rev.*, Vol.110., 883-885.
1982. Atmospheric Pressure Patterns, Climatic Change, and Winter Wheat Yields in North America. *Geoforum*, Vol.13, 263-273.
1982. Determination of the Climatic Component of Southern Pine Beetle Host Susceptibility with Multivariate Statistical Methods. Progress Report, USDA Cooperative Agreement 59/2513/1/3/006/0. 24pp.
1982. Statistical-Dynamic Models for Virginia Corn Yields. Final Report, USDA Cooperative Agreement 58/319T/1/0308. 50pp., and addendum of 13pp.
1983. Weather and the Southern Pine Beetle in Atlantic Coastal and Piedmont Regions. American Meteorological Society, 16th Conf. on Agric. and For. Meteor., Amer.Met. Soc., Boston Mass. pp241-244.
1983. Improved Specification of the Climatic Component of Southern Pine Beetle Host Susceptibility with Multivariate Statistical Methods. Progress Report, USDA/UVa Cooperative Agreement 5-29309. 15pp.
1983. Statistical-Dynamic Models for Virginia Corn Crops. American Meteorological Society, 16th Conf on Agric. and For. Meteor., Amer. Met. Soc., Boston, Mass. pp150-153. (with T.J. Smith, Senior Author)
1983. Temporal and Spatial Changes in Mesoscale Climatic Patterns. American Meteorological Society, 2nd Conf. on Climatic Variations. Amer. Met. Soc., Boston, Mass.p20.
1983. Price, Weather and "Acreage Abandonment" in Western Great Plains Wheat Culture. *J. Clim. and Appl. Met.*, Vol. 22, 1296-1303.
1983. Climate and High Yielding Variety Wheat Yields. *Geoforum*, Vol. 14, 441-446.
1984. Modification of MOS-Derived Thunderstorm Probabilities over Complex Terrain with Continental Scale Upper Air Data. American Meteorological Society, 10th Conference on Weather Forecasting and Analysis. Amer. Met. Soc., Boston, Mass. pp 160-164.
1984. Estimating the Future Areal Coverage of Pine Beetle Infestations over large areas: An Integrated Approach. Progress Report, USDA IPM on Bark Beetles. 23pp.
1984. Climate and the Southern Pine Beetle in Atlantic Coastal and Piedmont Regions. *Forest Science*, Vol. 30, 143-156.
1984. Statistical Relations between Summer Thunderstorm Patterns and Continental Mid-Tropospheric Heights. *Mon. Wea. Rev.*, Vol.112,778-789.
1985. Economic and Climatic Factors in "Acreage Abandonment" over Marginal Cropland. *Climatic Change*,6, 185-202.

1985. An Automated Objective Prediction Package for the Spread of Southern Pine Beetle. 17th Conf. on Agric. and For. Meteor., American Meteorological Society, Boston, Mass., 70-73.
1985. Sea-Breeze Induced Mesoscale Systems and Severe Weather. Progress Report to National Aeronautic and Space Administration. 26pp.
1985. Objective Prediction of Climate-Related Changes in the Distribution of Southern Pine Beetle. IN: Branham, S. J., and R. C. Thatcher, (eds.): Integrated Pest Management Research Symposium: The Proceedings. USDA Southern Forest Experiment Station General Technical Report SO-56, pp 41-52.
1985. SPBCMP: An Automated Prediction Package for Southern Pine Beetle. User's Guide. Southern Forest Experiment Station, Pineville, Louisiana. 34pp. (Phillip J. Stenger, Senior Author)
1985. Anomalous Mid-Atmospheric Heights and Persistent Thunderstorm Patterns over Florida. J. Climatol. 5, 529-542.
1985. Weathering the Media Storm. Washington Post Outlook 10/13/85.
1986. Timeliness and Accuracy of a Series of Empirical Crop/Climate Models under Extreme Conditions. Int. Jour. Ecol. and Environ. Stud. 12, 19-34.
1986. Commentary on "The Cumulative Impacts of Human Activities on the Atmosphere." In Cumulative Environmental Effects: A Binational Perspective, National Research Council, Washington DC, 127-129.
1986. Climatological Considerations for Siting a Crystalline Repository for High-Level Nuclear Waste in the Commonwealth of Virginia. Report to the Governor's Task Force on the Crystalline Repository Project. 26pp.
1986. SPBCMP--A Program to Assess the Likelihood of Major Changes in the Distribution of Southern Pine Beetle. S. Jour. App. For. 10, 158-161.
1986. Greenhouse Effect? Then Why is it Colder? Washington Post Outlook, 6/13/86.
1986. Southwide Modelling of Southern Pine Beetle Coverage Changes with Temperature and Objective Moisture Status Indicators. Theor. Appl. Clim. 37, 39-50.
1987. Climate and the Eastern Repository for High Level Nuclear Waste. Proceedings, 5th Conf. on Appl. Clim., American Meteorological Society, Baltimore MD, 35-39.
1987. Surrogate 500mb heights: An Objective Determinant of Climatic Change?. Proceedings, 5th Conf. on Appl. Clim., American Meteorological Society, Baltimore MD, 17-20.
1987. The Predictability of Sea-Breeze Generated Thunderstorms. World Meteorological Society Int'l Workshop on Rain Producing Systems in the Tropics and Extra-Tropics. World Meteor. Org. symp. pp unknown. (R. A. Pielke, Senior Author)

By Public Release of (OS/TP)

1987. Hurricanes, Droughts, and Southeastern Crop Yields. Proceedings, Southeastern Drought Symposium, Columbia SC. SC St. Climatology Pub G-30, 14-18 (Paul C. Knappenberger, Senior Author).

1987 Modelling the Climate Dynamics of Tree Death. Bioscience 37, 603-610.

1987 Climate and the Eastern Repository: A Comparative Study. Environ. Man. 15, (5), 627-636.

1987 Composite Climatology of Florida Summer Thunderstorms. Mon. Wea. Rev. 115 (10), 2781-2791.

1987 Nonthermometric Measurement of Secular Climatic Variability. CO2-Clim. Dial. 2, (1), 7pp.

1988 Sno Biz 88: Waiting for the Big One. Washington Post Outlook, 1/17/88.

1988. Nonthermometric Measurement of Recent Temperature Variability over the Conterminous United States, Southern Canada, and Alaska. CIRA Symposium on Climatic Change, Fort Collins, Colorado, 119-133.

1988. Simulation Models of Forest Succession. In: Rosswall, T., Woodmansee, R.G., and P. G. Risser, Eds., Scales and Global Change, SCOPE #39, J. Wiley, New York, 125-151. (H. Shugart, Senior Author)

1988. Anthropogenic Warming in North Alaska? J. Climate 1, 942-945.

1988. Origin and Destination of Pollutant-Bearing Airstreams Impacting and Exiting the Commonwealth of Virginia. Final Report to Virginia Air Pollution Control Board. 131pp. Additional Technical Appendix. 1800pp.

1989. Atmospheric Pollutant Transport: Take it or Leave it. Proceedings, 6th Conference on Applied Climatology, American Meteorological Society, Charleston SC, pp 80-83 (P.J. Stenger, Senior Author).

1989. Regional 500mb Heights Prior to the Radiosonde Era. Proceedings, 6th Conference on Applied Climatology, American Meteorological Society, Charleston SC, pp 184-187.

1989. The Greenhouse Climate of Fear. Washington Post Outlook 1/8/89.

1989. Testimony to the U.S. House of Representatives, Subcommittee on Energy and Power. U.S. Government Printing Office, Serial No. 101-31, 78-86.

1989. The Greenhouse Effect: Chicken Little and our Response to "Global Warming". J. Forestry 87, 35-39.

1989. The Science and Politics of Global Change. 7th International Pittsburgh Coal Conference, University of Pittsburgh, Vol 1, 173-182.

THE VIRGINIA CLIMATE ADVISORY

The *Advisory* is a quarterly publication of the State Climatology Office, targeted for Education, Governmental Agencies, and the educated layman. Current circulation is approximately 4,000. Each issue contains a main feature, a roundup of recent conditions, as well as an in-house generated long range forecast whose inaccuracy is held up for public scrutiny in each edition.

1980. 4 (1) Degree-days and energy usage in Virginia. 27pp.
1980. 4 (2) Modelling soybean/climate relationships. 24pp.
1980. 4 (3) History of tropical cyclones in Virginia. 33pp.
1981. 4 (4) History of drought in Virginia. 27pp.
1981. 5 (1) Satellite climatology. 26pp.
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1981. 5 (3) Winter severity over Virginia. 26pp.
1982. 5 (4) Coastal cyclogenesis. 26pp.
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1983. 7 (3) Mountain temperature regimes. 26pp.
1984. 7 (4) The Carbon Dioxide controversy. 26pp.
1984. 8 (1) Precipitation and Elevation. 30pp.
1984. 8 (2) Improvements for Virginia Thunderstorm Forecasts. 30pp.
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1985. 9 (1) Radar Climatology of Piedmont Thunderstorms. 30pp.
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1985. 9 (3) Hurricane Gloria. 30pp.
1986. 9 (4) Winter History since 1890. 30pp.
1986. 10 (1) Climate and High-Level Nuclear Waste Disposal. 30pp.
1986. 10 (2) Carbon Dioxide/Climate Revisited. 30pp.
1986. 10 (3) Virginia Acid Rain Research. 30pp.
1987. 10 (4) Hurricanes, Drought, and Va Agriculture. 30pp.
1987. 11 (4) The Ozone Hole and Nuclear Winter. 30pp.
1987. 11 (2) Virginia Evaporation Regimes. 30pp.
1987. 11 (3) Virginia Snow Phobia. 30pp.

1989. Crisis in Politics of Climate Change Looms on Horizon. Forum for Appl. Res. and Pub. Policy 4, 14-23.

1990. The Science and Politics of the Greenhouse Effect: Collision Course? In Environmental Consequences of Energy Production, University of Illinois, Chicago IL, 115-138.

1990. The Greenhouse Effect: Beyond the Popular Vision of Catastrophe. Liberty 3, 27-33.

1990. I Remember Camille. Mar. Wea. Log. 34, 8-11.

1990. The Greenhouse Effect and Global Change: Review and Reappraisal. Int. Jour. Envi. Stud. 36, 55-71.

1990. Climatic Change and Climatic Uncertainty: A Regional Perspective. Proceedings, 21st meeting, Advisory Committee on Water Data for Public Use, U.S. Geological Survey, New Orleans LA, 36-59.

In Press. Observed and Projected Climatic Change: Fact and Fiction. EPRI Symposium "Interaction of the Global Carbon and Climate Systems", Electric Power Research Institute, Palo Alto, CA.

In Press. Testimony to the Committee on Foreign Relations, United States Senate. To Congressional Record, 4/21/89.

In Press. Regional 500mb Heights Prior to The Radiosonde Era. Theor. Appl. Clim. Accepted 10/89.

In Press. Global Climate Change and the U.S. Southeast: Much More Research is Needed. Symposium on Global Change and the Southeast, Southeast Regional Climate Center, Charleston SC, 2/90.

In Press. The Predictability of Sea-Breeze Generated Thunderstorms. Atmosfera, accepted 4/90 (R.A. Pielke, Senior Author).

In Press. Global Warming: A New Synthesis. In Jastrow, R., Editor. The Greenhouse Problem, Jamison Books, Washington DC, Accepted 6/90

In Press. Cluster Analysis of Southeastern U. S. Climate Stations. Theor. Appl. Clim. Accepted 11/90. (D.E. Stooksbury, Senior Author)

In Press. Global Warming: An Increasingly Unlikely Apocalypse. In Simon, J., Editor. The Resourceful Species, Accepted 12/90.

In Review. Climatic Change in Mixed-Layer Trajectories over Large Regions. Submitted to Theor. Appl. Clim. 6/90. (P.J. Stenger, Senior Author)

In Review. Cyclone Tracks and Wintertime Climate in the Mid-Atlantic Region of the United States. Submitted to J. Climatol. 7/90. (P.C. Knappenberger, Senior Author)

- 1988. 11 (4) Updated Climatic History. 30pp.
- 1988. 12 (1) Historical Floods. 30pp.
- 1988. 12 (2) Acid Precipitation Trajectories. 30pp.
- 1988. 12 (3) Eastern Shore Hurricane History. 30pp.
- 1989. 12 (4) Eastern Shore Northeaster History. 30pp.

- 1989. 13 (1) Testimony on Greenhouse Effect. 30pp.
- 1989. 13 (2) Hurricane Camillo. 30pp.
- 1989. 13 (3) Hurricane Hugo. 30pp.

- 1990. 14 (2) Scales of Temperature Variation. 30pp.
- 1990. 14 (3) Climate of Saudi Arabia. 30pp.

THE SOUTHEASTERN CLIMATE REVIEW

The Southeastern Climate Review is a technical and public service publication of the Southeast Regional Climate Center. Circulation is approximately 4,500.

- 1989. 1 (1) Background on Climatic Change. 30pp.
- 1989. 1 (2) Hurricane Camille. 30pp.
- 1990. 1 (3) Hurricane Hugo. 30pp.
- 1990. 1 (4) Severe Cold Outbreaks. 30pp.

- 1990. 2 (1) Drought Preparedness. 30pp/

FINANCIAL SUPPORT (OVER \$15,000)

1981-1985. United States Department of Agriculture, Forest Service. Prediction models for Southern Pine Beetle Outbreaks. \$133,000.

1981-1982. United States Department of Agriculture, Economics Research Service. Statistical-Dynamic Models for Virginia Corn and Southern Yields. \$25,000.
Administration Sea Grant Program High Resolution Weather Forecasts for Chesapeake Bay and estuarine Virginia. \$84,000.

1983-1985. National Aeronautic and Space Administration. Sea Breeze-Induced Mesoscale Systems and Severe Weather. \$26,000.

1985-1986. United States Department of Agriculture, Forest Service. Historical fluctuations of Gypsy Moth Populations and Climate. \$18,000.

1986-1987. National Oceanic and Atmospheric Administration. Objective Characterization of the Relationship between Seasonal Wind Regimes and the Recruitment of Croaker Flounder. \$41,000

by Andrew Nelson of (05171)

Andrew K. Nelson
Marine Policy Center
Woods Hole Oceanographic Institution

1986-1988. Commonwealth of Virginia, State Air Pollution Control Board. Origin and Destination of Pollutant-bearing Airstreams Entering and Exiting the Commonwealth of Virginia. \$140,000.

1989-1990 Southeastern Regional Climate Center. Research Publication for the Southeastern Climate Center. \$76,000

1989-1990. Jet Stream Alterations Induced by Anthropogenerated Sulfur Emissions. Cyprus Minerals Company. \$40,000

LAST UPDATE OF RESUME: December 21, 1990

Marine Policy Center
Woods Hole Oceanographic Institution

Education:

- 1984 Ph.D. Geostatistics
Stanford University
- 1981 M.S. Geostatistics
Stanford University
- 1977 B.A. Economics
Harvard University

Honors:

- Magna cum laude with highest distinction in Economics, Harvard University
- Phi Beta Kappa, Harvard University
- Danceuse Independent Study Award, Woods Hole Oceanographic Institution
- President's Award, International Association for Mathematical Geology

Memberships:

- American Statistical Association
- Climate Trends Panel, National Climate Program Office
- Scientific Working Group, Intergovernmental Panel on Climate Change

Research Interests:

spatial statistics, stochastic modelling, Bayesian methods, environmental statistics, animal behavior