

NEW COURSE-FALL 2004

Mesoscale Meteorological Modeling

ATMO595E (3 units)

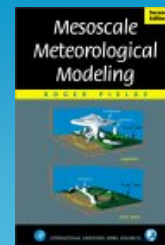
Instructor: [Dr. Roger A. Pielke](#), Professor
Department of Atmospheric Science
Colorado State University

Time: Last 8-9 weeks of Fall 2004, 4 to 5 hours per week

Location: Physics and Atmospheric Sciences (PAS) Bldg. Room 488

Prerequisites: Strong quantitative background in ATMO, HWR, GEOS, PHYS, MATH, PTYS, CE, CHEE, SWES.
Differential Equations, Physics, Computer Programming

[Course Homepage at CSU](#)



Introduction

Mesoscale meteorological models are used in a wide range of studies and disciplines, such as weather prediction, hydrologic modeling, air chemistry, atmospheric dispersion, regional and climate assessments, and planetary atmospheres.

This is a unique opportunity for UA graduate students to learn theoretical and practical aspects of mesoscale modeling from a world authority on the subject. Students will have the opportunity to run state-of-the-art mesoscale models under the guidance of Dr. Pielke on the 64-node Beowulf cluster of Department of Atmospheric computers.

Topics

1. Governing Equations and Simplification
2. Conservation Relations
3. Physical and Analytic Modeling
4. Coordinate Transformations
5. Parameterization-Averaged Subgrid-Scale Fluxes
6. Parameterization of Averaged Radiation Flux Divergence
7. Parameterization of Moist Thermodynamic Processes
8. Boundary and Initial Conditions
9. Model Evaluation
10. Examples of Mesoscale Models

Grading

Grades will be determined from exams, homework, projects and student presentations. Computing instruction (UNIX, Graphics programming, and FORTRAN) will be provided throughout the semester.

Roger A. Pielke: Career Overview

Dr. Pielke has studied terrain-induced mesoscale systems, including the development of a three-dimensional mesoscale model of the sea breeze, for which he received the NOAA Distinguished Authorship Award for 1974. Dr. Pielke has worked for NOAA's Experimental Meteorology Lab (1971-1974), The University of Virginia (1974-1981), and Colorado State University (1981-present). He is currently a Professor of Atmospheric Science at CSU. He has served as Chairman and Member of the AMS Committee on Weather Forecasting and Analysis, and was Chief Editor for the *Monthly Weather Review* for five years from 1981-1985. In 1977, he received the AMS Leroy Meisinger Award for "fundamental contributions to mesoscale meteorology through numerical modeling of the sea breeze and interaction among the mountains, oceans, boundary layer, and the free atmosphere." Dr. Pielke received the 1984 Abell New Faculty Research and Graduate Program Award, and also received the 1987/1988 Abell Research Faculty Award. He was declared "Researcher of 1993" by the Colorado State University Research Foundation. He has authored a book published by Academic Press entitled *Mesoscale Meteorological Modeling*, a book for Routledge Press entitled *The Hurricane*, and co-authored (with W. Cotton) a book for Cambridge Press entitled *Human Impacts on Weather and Climate* and co-authored (with R. Pielke, Jr.) a book published by John Wiley and Sons entitled *Hurricanes: Their Nature and Impacts on Society*. He was elected a Fellow of the AMS in 1982. From 1993-1996, he served as Editor-in-Chief of the US National Science Report (1991-1995) for the American Geophysical Union. From January 1996 to the present, he has served as Co-Chief Editor (with W. Cotton) of the *Journal of Atmospheric Science*.

Dr. Pielke has published over 220 papers in peer-reviewed journals, 32 chapters in books, and co-edited five books.

[Dr. Pielke Homepage](#)

[Research Homepage](#)