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**Contents**

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## **'Fire and forest meteorology'**

*Edited by SA Ferguson, TJ Brown and M Flannigan*

**This issue is dedicated to David W. Goens**

Preface	iii	
Seasonal fire danger forecasts for the USA <i>J. Roads, F. Fujioka, S. Chen and R. Burgan</i>	1–18	This paper shows the skill of experimental seasonal meteorological forecasts of indices of the US National Fire Danger Rating System (NFDERS). As the forecast models continue to improve, we can expect to eventually see even more skilfully projected conditions for the next season and longer for many US locations.
Evaluation of the Experimental Climate Prediction Center's fire danger forecasts with remote automated weather station observations <i>Hauss J. Reinbold, John O. Roads and Timothy J. Brown</i>	19–36	The Scripps Experimental Climate Prediction Center has been making forecasts of atmospheric elements and fire danger indices since 1997. This study evaluates these forecasts using automated weather station observations. Bias and anomaly correlations are computed for atmospheric elements and fire danger indices. Fire danger indices are shown to have much lower correlations than atmospheric elements.
Modeling interactions between fire and atmosphere in discrete element fuel beds <i>Rodman Linn, Judith Winterkamp, Jonah J. Colman, Carleton Edminster and John D. Bailey</i>	37–48	Discrete porous element fuel beds are incorporated into the coupled atmosphere–wildfire behavior model HIGRAD/FIRETEC. Four simulations are presented with different canopy and understory configurations. We found that the ground fuel density was the determining factor in the overall spread rate of the fire, even when the overstory was involved in the fire.
Simulation of the Big Elk Fire using coupled atmosphere–fire modeling <i>Janice L. Coen</i>	49–59	The NCAR coupled atmosphere–fire model was used to simulate the case of the Big Elk wildfire, which occurred during July 2002 in Colorado. Sensitivity experiments show that fire–atmosphere feedbacks improve representation of the fire shape, but that simulations with relatively coarse atmospheric grid spacing qualitatively capture fire progression, making real-time modeling on one processor possible.
Coherent vortical structures in numerical simulations of buoyant plumes from wildland fires <i>Philip Cunningham, Scott L. Goodrick, M. Yousuff Hussaini and Rodman R. Linn</i>	61–75	Buoyant plumes arising from surface-based heat sources in the presence of a crosswind are simulated using a three-dimensional numerical model. Several different types of coherent vortical structures are seen in the simulations, and these structures correspond closely to those observed in plumes from wildland fires. In all simulations, the plume cross section is poorly represented by a self-similar Gaussian distribution.
The role of released moisture in the atmospheric dynamics associated with wildland fires <i>Brian E. Potter</i>	77–84	This paper examines the hypothesis that water produced during wood combustion, and the water contained in wood prior to combustion, may constitute a significant portion of the water vapor in a fire's convective plume. It presents observational data to support this hypothesis and examines the potential consequences for plume dynamics.

<hr/> Planned Burn-Piedmont. A local operational numerical meteorological model for tracking smoke on the ground at night: model development and sensitivity tests <b>Gary L. Achtemeier</b>	85–98	Land managers who plan and execute prescribed burns need to know where and when dangerous smoke conditions will likely occur. Smoke from prescribed fires can become entrapped near the ground at night and carried into populated areas or across roadways where it can create visibility hazards. Planned Burn-Piedmont is a fine scale, time-dependent, smoke tracking model that gives high resolution in space and time predictions of smoke movement near the ground over complex terrain typical of south-east USA.
<hr/> Fire spread in chaparral—‘go or no-go?’ <b>David R. Weise, Xiangyang Zhou, Lulu Sun and Shankar Mahalingam</b>	99–106	The effects of wind velocity, moisture content, slope, species and fuel loading on fire spread success in 125 laboratory fires in live chaparral fuels are presented. A logistic model to predict spread success was developed; wind velocity and fuel loading are two important variables related to success. The logistic model was compared with a prescription matrix developed for chaparral.
<hr/> Smoke measurements during Gestosa-2002 experimental field fires <b>A. I. Miranda, J. Ferreira, J. Valente, P. Santos, J. H. Amorim and C. Borrego</b>	107–116	Air pollutant measurements performed during an experimental field fire in Portugal are presented. Results confirm that biomass-burning episodes, as prescribed fires and wildfires, emit to the atmosphere hazardous concentrations of gases and particles. In particular, firefighters can be exposed to unhealthy air pollutant concentrations during daily activity.
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