ON THE RELEVANCE OF THE VENTILATION INDEX AS A TOOL FOR REGULATING PRESCRIBED FIRE

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ABSTRACT

Time-integrated (22-hour) $PM_{2.5}$ data, real-time $PM_{2.5}$ and CO data, weather data, and ignition/burn data for 56 prescribed fires at Savannah River, South Carolina, were collected over a 6-year period from 2002 to 2007. There were set up as many as 22 samplers in a network extending from 0.25 to 10 km downwind from each burn. One of the purposes of the study was to quantify downwind concentrations of $PM_{2.5}$ at various distances from the burns for calculating statistical relationships between $PM_{2.5}$ concentration, weather conditions, and ignition/burn conditions for determining whether the results support assumptions in current smoke management guidelines/regulations. There is no statistical relationship between size of burns (30 to almost 3,000 acres) or ignition method (hand vs. aerial) and the average $PM_{2.5}$ concentration downwind from the burns. The relationship between $PM_{2.5}$ mixing height, transport wind speed, and ventilation rate is weak and more complex than implied by current smoke management rules.

Keywords: air quality, guidelines, prescribed fire, smoke management, ventilation index.

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FIELD VALIDATION OF PB-PIEDMONT

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ABSTRACT

PB-Piedmont, a wind/smoke model designed to simulate smoke transport during the night, is gaining acceptance as a smoke management tool. The purpose of the model is to alert land managers where and when smoke from prescribed burns might adversely impact visibility over roadways. From 2003 to 2006 PB-Piedmont was validated for 20 prescribed burns over the Georgia Piedmont and for 12 prescribed burns over the South Carolina upper Coastal Plain—a total of 395 smoke/no-smoke observations. The data were condensed into predicted vs. observed matrices for each data set. PB-Piedmont was found accurate 75% of the time in the Georgia Piedmont and 64% of the time in the South Carolina upper Coastal Plain.

Keywords: accidents, fog, highway, prescribed fire, smoke.

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