

Regional Sulfur and Oxidant Modeling

The Air Quality Division has contracted research over the past 6 years to develop and test mathematical models to be used for assessing long distance transport of man-made pollutants. A model (RTM-II) was developed to simulate sulfur dioxide and sulfate concentrations in four national parks (Acadia, Great Smoky Mountains, Mammoth Cave, and Shenandoah). (See *Park Science*, Winter 1985, p. 6-8). A local transport and dispersion model is being applied in Shenandoah National Park. This local model will be coupled with the long-range transport model. By using a combination of the two models, the contribution of

local, as well as far distant, air pollution sources to pollution buildup in the park can be evaluated.

Another version of the long-distance transport model (RTM-III) has been developed for predicting the distribution of photochemical oxidants. Evaluation and testing studies have been made using the Electric Power Research Institute (EPRI) Sulfate Regional Experiment data which were collected at nine stations in the eastern United States.

The model has been applied in a 31-state region of the eastern United States. These results provide ozone concentration estimates for the period July 16-23, 1978. From these results, ozone concentrations have been estimated for this time period in the same four parks to which RTM-II was applied. Ozone concentrations during this brief period are near the one-hour standard of .12 ppm.

An improved version of the model is currently being applied for a smaller area encompassing Shenandoah National Park. For this application a reactive plume model (RPM) is being incorporated into the regional model so the contribution of single sources to the total pollution burden may be assessed. The improved version of the model is being applied to the Central Valley of California to estimate ozone concentrations in Sequoia, Kings Canyon, and Yosemite national parks. The model results from the above applications will be used by the National Park Service to assist with the assessment of observed injury to vegetation, evaluation of acidic deposition, and visibility impairment in the national parks.

The model has received considerable recognition, even outside the United States. It is currently being applied in western Europe, and plans are in progress to apply it in some Canadian provinces. Other Federal agencies have also shown interest in using the model. The Environmental Protection Agency has had the model applied in the central United States to estimate ozone concentrations in agricultural areas. They also have indicated an interest in working with the National Park Service on the above mentioned Central Valley study to estimate ozone concentrations in agricultural areas of the Central Valley.

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