

Preface

Concern over air quality has never been higher in the public mind in both developed and less developed countries. This concern is reflected in ever tightening legislation, and the vigorous activity of regulatory authorities. The easily won gains in air quality have already been made throughout the developed world by the implementation of inexpensive but effective control measures. Air quality management is therefore addressing an ever steepening part of the cost/benefit curve, whereby each incremental improvement in air quality becomes increasingly expensive as the atmosphere becomes cleaner. Thus, methods to quantify the improvements required, to predict the source controls most appropriately applied, and to provide cost/benefit analyses of the reductions are becoming increasingly sophisticated. This volume deals with the scientific aspects of such air quality management procedures.

The first article, by D. R. Middleton, sets the scene by describing from a UK perspective the developments currently in hand to provide a scientific basis for air quality management. Subsequent articles deal with specific components of the air quality management process. Effective control of primary air pollution depends critically upon good knowledge of the sources of emissions and their geographic locations. This is encompassed by emissions inventories, and the article by D. Hutchinson deals with the now rather sophisticated subject of compilation of source emissions inventory data; it is illustrated by reference to the recently compiled emissions inventory for the UK West Midlands. A second crucial aspect of air quality management is the monitoring of air pollution. This provides information on the temporal trends in air quality and gives a direct measure of the compliance or otherwise of air pollutant concentrations with ambient air quality standards designed to protect human health, ecosystem function or the integrity of inert materials. The design and operation of air monitoring networks is described in the third article by J. Bower. Both source emissions data and monitoring information are central to the activity described in the fourth article by A. Skouloudis, who gives a comprehensive overview of the scientific considerations in the European Auto-Oil study, which was sponsored by the European Commission in order to determine the most cost-effective means of meeting air quality targets. It was therefore central to the setting of vehicle emission and fuel quality standards for implementation in the years 2000 and 2005.

Secondary air pollutants are those formed within the atmosphere and these present considerable difficulties in evaluating the effectiveness of controls of precursor emissions upon concentrations of the secondary pollutant. Often the relationship between emission of the precursor and concentration of the pollutant are strongly non-linear. The fifth article by P. Hopke on source-receptor modelling of air pollution addresses the very difficult technical issue of how, starting from ambient air quality data, it is possible to identify the source areas contributing to secondary pollutants to the atmosphere. The sixth article by M. Hornung and colleagues deals with the use of geochemical or biological

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tolerances (critical loads) to determine the maximum allowable inputs of acidic pollutants to the terrestrial environment. This approach is now heavily embodied in air pollution control policy development within Europe. The final article by A. C. Lloyd gives a fascinating perspective of the successes and problems of air pollution control in California, the US state which has for many years led the way in promoting vigorous air pollution control measures, but still has massive problems to overcome.

We are very fortunate in having attracted articles from leading workers in this field representing the best of scientific endeavour from both Europe and North America. We are most grateful to them for providing readers with a comprehensive perspective of the current state of the art of air quality management.

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