

21 MARCH 2001 : AN OPEN DISCUSSION MEETING - URBAN METEOROLOGY AND AIR QUALITY

Dr J Thornes, University of Birmingham - The thermal climatology of urban areas - j.e.thornes@bham.ac.uk

A one-dimensional road surface energy balance model has been modified to account for the geographical variables of latitude, optical depth, sky-view factor, slope and slope orientation for the West Midlands (UK). The physical variables of albedo, emissivity and surface roughness are also included. Using a satellite landcover classification, aided by a field analysis of urban canyon characteristics, it has been possible to estimate the spatial variety of surface variables across the West Midlands. Winter Solstice heat island intensity for calm clear nights in the West Midlands is calculated to be 4.7°C. The structure of the heat island suggests that current Open Road weather forecast zones are not applicable in simulated clear calm conditions because of the wide temperature variations caused by the degree of urbanisation.

Dr S Belcher, University of Reading - The dynamics of urban meteorology - s.e.belcher@reading.ac.uk

We are developing an urban canopy model to describe the winds and temperatures over urban conurbations for application in local forecasting, parameterisation in NWP and pollution mixing and transport. Results from observations and laboratory studies of mixing and transport in street canyons that underpin the modelling will be presented. The talk will then also present the basis of the conurbation-scale modelling.

Professor J Hunt, Environmental Research Consultants - Modelling urban air quality - jcrh@mssl.ucl.ac.uk

Abstract not available

Dr X Cai, University of Birmingham - Using RAMS/UAM to model air quality - x.cai@bham.ac.uk

During the summer campaign of the PUMA (Pollution of Urban Midland Atmosphere) project, observation and numerical modelling of meteorological conditions and atmospheric pollution in the West Midlands have been carried out at an urban scale. One episodic event of photochemical pollution is examined. This study shows a comparison of modelled results with observed data for meteorological variables (wind and temperature) and some pollutants.

Dr M Gallagher, University of Manchester - Aerosol fluxes - sources, sinks and methodologies for urban measurement - martin.gallagher@umist.ac.uk

Most major UK cities are now equipped with particle measurement systems of one form or another (QUARG 3rd Report, 1996) to identify concentrations, particle size

distribution and chemical composition. Although providing valuable information of street level concentrations that help indicate the major source categories and dominance of motor vehicle contribution to PM-10 the actual fluxes of urban particles on the larger urban scale are not well known. Generalisation of data from highly heterogeneous site specific urban sources to meteorologically dependent net aerosol sources and sinks is an uncertain exercise.

The SASUA programme attempts to address this issue by measuring the size dependent emission of urban aerosol directly on cityscape scales using established micrometeorological techniques. Preliminary urban scale results of size segregated aerosol number and mass fluxes will be presented with suggested methodologies for using this type of information to obtain net urban particle emissions for comparison with inventory and indirect techniques.

Professor R Harrison, University of Birmingham - Urban air quality and the NERC Urgent programme - R.M.Harrison@bham.ac.uk

The talk will start with a short overview of the atmospheric science research within the URGENT programme and the ways in which it is geared to user needs. This will be followed by a description of some of the research undertaken within the PUMA Consortium Project on 'Observation and Modelling of Air Pollution within the Atmosphere of the West Midlands Conurbation'. A wide range of measurements have been made including classical air pollutants, speciated volatile organic compounds and reactive free radicals such OH, HO² and NO³. Modelling activity is seeking to develop box models and Lagrangian and Eulerian grid models with a view to simulating the air quality measurements