A COMPARISON AND EVALUATION OF LOCAL SCALE MODELS AND IMPLICATIONS OF THEIR PERFORMANCE FOR LOCAL AIR QUALITY MANAGEMENT - A UK CASE STUDY

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National and European legislation is compelling local authorities in the UK and Europe to assess and manage air quality within their boundaries. Generally, air pollution is a problem of concern in urban areas, where road traffic is usually its most important contributor. The latest assessment from European Environment Agency suggests that during 1996-2004, 22-45% of the urban population was exposed to NO2 in excess of the EU limit value for human health. Although, over the years, vehicle technology has improved resulting in lower pollutant emissions, an increase in the number of vehicles and changes in fleet mix and associated emission profiles is nullifying these decreases. The UK ministry of environment (DEFRA) suggest that over the 20 year period, 1996-2016, urban traffic in the UK is estimated to increase by 30-40%. Many European urban areas are reporting exceedences of air quality limit values near roads resulting from the traffic flows and typical urban driving conditions.

The assessment of road traffic impacts on air quality is, therefore, of paramount importance to manage the air quality, particularly in urban areas. A number of local scale models (impact assessment range in the neighbourhood of streets) are widely and routinely used to assess the road traffic impacts. The models can differ significantly in terms of data needs, parameterisation of dispersion processes, and may provide predictions which might be considerably different.

The main aim of this paper is to compare and evaluate some widely used traffic impact assessment models for the prediction of NOx/NO2 concentrations and analyse the implications of their performance for local air quality management (LAQM). Detailed models, ADMS-Roads; CAR-FMI and TNO Traffic Model, and the simple models, DMRB; CAR-International and Aeolius are applied to two case studies of LAQM from the UK urban areas to predict pollutant concentrations near roads. The model results are compared against the monitoring data to evaluate the model performance. The implications of the model performance for LAQM are analysed and comments are made in terms of the data needs for various models, model limitations, the comparison of screening versus advanced models and model suitability for specific scenarios or conditions.

EXTENDED ABSTRACT NOT SUPPLIED