

DEVELOPMENT OF AN INTELLIGENT AIR POLLUTION MODELLING SYSTEM

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The Air Quality Strategy and part IV of The Environment Act, within the United Kingdom, highlights the need for local authorities to undertake air quality assessments. However, many of the dispersion modelled studies undertaken for this purpose do not accurately predict short term average concentrations (i.e. one day or less) and have limited validation data for short-term averages. The inability of dispersion models to predict short-term averages is generic of the typically used Gaussian dispersion model. The work presented in this paper has concentrated on investigating, developing, designing and testing an innovative method of linking dispersion modelled and monitored results using artificial neural networks. The objectives of the study were to establish the relationships between short term (1 hour) air pollution monitored data, air pollution data produced through dispersion modelling and meteorological data and to use the findings to create and validate a new intelligent 'control' model to correct errors in dispersion modelling results, such as those that occur during low wind speeds, when many Gaussian models are known to under predict. The study shows that artificial neural networks can be used to simulate the complex relationships between dispersion modelled and monitored data. The adopted method is amenable for use with many dispersion models and geographical areas. It is most suited to occasions when in-depth air pollution analysis is necessary, for short-term averages, as now statutorily required in the UK and many other countries.