



The adaptation of the UM-CMAQ modelling system for urban air quality applications

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The forecasting model of the U.K. Meteorological Office (UKMO), known as the Unified Model (UM) has been developed to support a wide variety of global and mesoscale applications. Recently, increased resolution has allowed the exploration of issues on smaller scales. Urban air quality is one such application that requires valid high resolution meteorological input and can benefit from a multi-scale approach. With this in mind, the UM has been coupled to a chemistry transport model (CMAQ) in order to simulate high pollution episodes over the London area. The offline coupling is enabled by the newly developed UM-MCIP meteorological pre-processor, based on the Meteorology-Models 3 Chemistry Interface Processor (MCIP) for CMAQ.

The system has been used to simulate a summer period in August 2003, when extreme high temperatures and ozone concentrations were experienced over Western Europe, including the UK. Initial comparisons are made with ground based measurements for meteorological factors (surface temperature, wind speed and direction) and air pollutant concentrations (ozone, NO_x). Included will be an analysis of the urban boundary layer over London using the UM, concentrating on surface parametrisation and treatment of land-cover data. This will be discussed in relation to international developments in meteorological modelling such as the Weather and Research Forecast (WRF) model.