

EXPERIMENTS IN LONDON - DAPPLE - DISPERSION OF AIR POLLUTION AND ITS PENETRATION INTO THE LOCAL ENVIRONMENT

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DAPPLE is a 4-year, UK, Engineering and Physical Sciences Research Council (EPSRC) funded project within the Infrastructure and Environment Programme. The aim of the project is to enhance understanding of dispersion processes in realistic urban environments i.e. street canyon intersections. This information will be used to make improvements in predictive ability that will enable better planning and management of urban air quality, accidental and non-accidental releases, and the development of safer more sustainable cities. At present processes of dispersion are poorly understood over short distances in the urban environment. The DAPPLE project brings together a multidisciplinary research group from six UK universities. Research is being undertaken in the field, wind tunnel, and via numerical simulations in order to provide a better understanding of the physical processes affecting street and neighbourhood scale flow of air, traffic, and people and their corresponding interactions with the dispersion of pollutants at street canyon intersections. Measurements from the two DAPPLE field campaigns, April-May 2003 and April-June 2004, undertaken at the intersection of Marylebone Road and Gloucester Place, Westminster, Central London, UK. The data include: 1/ wind field - up to 11 ultrasonic anemometers were deployed at heights ranging from 1.5 - 180 m within and above the street canyon intersection. A lidar was also deployed for a day on the roof of Westminster City Council which is located at the SW corner of the intersection; 2/ pollution levels - monitored using 15 CO Larian streetboxes at the intersection and surrounding streets; vertical pollution gradients of CO, CO₂, O₃ and PM_{2.5}, and integrated path measurements of pollutants at roof level using an OPSIS; 3/ Personal exposure - measurements of CO, PM_{2.5} and ultrafines by people carrying instrumentation through the study domain using different locations on the pavement, routes of travel and modes of transport; 4/ Traffic flow - manual traffic count validations of the SCOOT traffic management system used by Transport for London; and 5/ Tracer releases - inert tracers (SF₆ and PMCH) were released in SW winds from vehicles parked in York Street, a road parallel and to the south of Marylebone Road, and from the council roof. Time series of air samples at 16 locations through out the study area were used to sample the passage of the tracers. Analysis of the DAPPLE data are ongoing however the preliminary results presented highlight the potential output of the project.