



Investigating the influence of boundary layer entrainment on surface ozone concentrations within an air quality forecast

Kaja Milczewska (1), Helen Dacre (1), Paul Agnew (2), Lucy Neal (2), and Marion Mittermaier (2)

(1) University of Reading, Department of Meteorology, Reading, United Kingdom (k.m.milczewska@pgr.reading.ac.uk), (2) UK Met Office, Exeter, United Kingdom

Correctly forecasting regional surface concentrations of pollutants is important to public health, as exposure to elevated concentrations may trigger respiratory problems.

This study aims to determine the extent to which surface ozone forecasts are dependent on the representation of boundary layer processes. We evaluate UK-wide hourly ozone forecasts within Met Office Air Quality configuration of the Unified Model (AQUM), using routine ground-level measurements taken during June 2017. AQUM captures the timing of daytime peak in ozone concentrations, with a 2-hour lag in the morning increase. This suggests that the delayed onset of the boundary layer growth is related to subsequent mixing of ozone-rich air from the night-time residual layer to surface.

Presented are results from a semi-idealised configuration the Numerical Atmospheric-dispersion Modelling Environment (NAME), where a novel tagging mechanism enables the partitioning of particles' sources and trajectories, thus quantifying the influence of entrainment into the boundary layer on near-surface ozone concentrations.