

4.120 Inaccuracies in meteorology within a regional air quality forecast.

Early Career Scientist

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Abstract:

Correctly forecasting air quality (AQ) is of importance to public health on a daily basis, as exposure to elevated concentrations of pollutants can trigger health problems, particularly for people with existing heart, lung or breathing conditions. The accuracy of an AQ forecast is dependent on the forecast skill of the meteorology, as accumulation, dispersion and deposition of pollutants is highly dependent on regional weather conditions.

In this study we explore some of the relationships between inaccuracies in meteorological parameters (e.g. precipitation, surface sensible heat flux (SSHF), boundary layer height) and forecast levels of surface particulate matter (PM) and ozone (O₃) within the UK Met Office air quality model AQUM. We present some initial results for spatial correlations between modelled and observed PM and precipitation for a year-long period, quantifying the strength of their relationship with distance and explore how errors in precipitation modelling may influence PM forecasting.

We also present preliminary results from a study of how model temporal evolution of the urban boundary layer influences the observed peak in the model's positive O₃ bias. In this analysis, the influence of modelled SSHF on the dynamics of vertical transport and entrainment of O₃ from the night-time residual layer, and its subsequent impact on near-surface O₃ concentrations, is explored.

This study may lead to improvements in forecasting O₃ concentrations in urban areas and a greater understanding of the role of modelled precipitation on the surface PM forecast.

Key words: boundary layer, surface pollutants, regional forecasting, meteorology