1.141 Health Impacts associated with O3 and PM2.5 air quality episodes in the UK in 2006.

Early Career Scientist

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Abstract:

We used a coupled chemistry-climate model (AQUM) at a 12 km resolution to simulate maximum daily 8-hour (MDA8) O_3 and daily mean $PM_{2.5}$ concentrations during two five-day air pollution episodes in summer 2006 (1-5 July and 18-22 July). Both episodes were driven by anticyclonic conditions with light easterly and south easterly winds and high temperatures that aided pollution build up. For each of these episodes we calculated the short-term exposure attributable to population-weighted MDA8 O_3 and daily mean $PM_{2.5}$ concentrations.

Over the two episodes (totalling 10 days), the estimated total mortality burden attributable to short-term exposure to MDA8 O_3 was associated with 70 daily deaths brought forward, summed across the UK. The estimated health impact due to short-term exposure to daily mean $PM_{2.5}$ concentrations differed during the two air pollution episodes with about 43 and 36 daily deaths brought forward during the first and second episodes, respectively. The corresponding percentage of all-cause (excluding external) mortality due to short-term exposure to MDA8 O_3 and daily mean $PM_{2.5}$ during these episodes ranges from 5.2% to 3.4% and from 3.9% to 2.0%, respectively.

For all episodes, the regions having the highest number of deaths brought forward were the North West and the South East regions of the UK due to a relatively higher population density in these regions. However population-weighted pollutant concentrations varied depending on region and episode.

We estimate that the short-term exposure to MDA8 O_3 and daily mean $PM_{2.5}$ during these episodes was between 36-38% and 39-56% higher, respectively than expected seasonal mean estimates. This highlights the potential of air pollution episodes to have substantial short term impacts on human health burdens.