Air Quality Models in Houston Texas: A tale of two ozones

Speakers

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Abstract:

In 2000 the U.S. EPA named Houston, TX the dirtiest city in America. In the subsequent decade Houston saw dramatic reductions in ozone concentrations allowing the city to achieve the 1997 8-hr ozone standard. This success story is in part due to the policy changes in 2004 that recognized a phenomenon in Houston that leads to high ozone. In Houston some of the highest measured 8-hr ozone (O_3) peaks are characterized by sudden increases in observed concentrations of at least 40 ppb in one hour, or 60 ppb in two hours. Measurements show that these large hourly changes appear at only a few monitors and span a narrow geographic area suggesting a spatially heterogeneous field of O_3 concentrations. The regulatory air quality model (AQM) did not reproduce the magnitude or location of some of the highest observed hourly O_3 changes, and it also failed to capture the limited spatial extent. On days with measured large hourly changes in O_3 concentrations, the AQM predicted high O_3 over large regions of Houston resulting in over predictions at several monitors. We will discuss the cause of this high ozone, the failure of the AQM to predict it, and the innovative policies used to mitigate it. In 2008 the EPA designated a stricter 8-hour ozone standard. Are these periods of high ozone still important in Houston given the new standard?

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