



The impact of COVID-19 on CO₂ emissions in the Los Angeles and Washington DC/Baltimore metropolitan areas

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Responses to COVID-19 have resulted in unintended reductions of city-scale carbon dioxide (CO₂) emissions. Here we detect and estimate decreases in CO₂ emissions in Los Angeles and Washington DC/Baltimore during March and April 2020. Our analysis uses three lines of evidence with increasing model dependency. The first detects the timing of emissions declines using the variability in atmospheric CO₂ observations, the second assesses the continuation of reduced emissions using CO₂ enhancements, and the third employs an inverse model to estimate the relative emissions changes in 2020 compared to 2018 and 2019. Emissions declines began in mid-March in both cities. The March decrease (25%) in Washington DC/Baltimore is largely supported by a drop in natural gas consumption associated with a warm spring whereas the decrease in April (33%) correlates with changes in gasoline fuel sales, a proxy for vehicular emissions. In contrast, only a fraction of the March (17%) and April (34%) reduction in Los Angeles is explained by traffic declines, while the remainder of the emissions reduction remains unexplained. To help diagnose such observed changes in emissions, more reliable, publicly available emission information from all significant sectors needs to be made available. Methods and measurements used herein highlight the advantages of atmospheric CO₂ observations for providing timely insights into rapidly changing urban emissions patterns that can empower cities to course-correct mitigation activities more efficiently.

