

Smaller Than Expected Benefit of COVID-19 Lockdown on Urban Air Quality

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Abstract

The COVID-19 lockdowns led to major reductions in air pollutant emissions. Here, we quantitatively evaluate changes in ambient NO₂, O₃, and PM_{2.5} concentrations arising from these emission changes in 11 cities globally by applying a deweathering machine learning technique. Sudden decreases in deweathered NO₂ concentrations and increases in O₃ were observed in almost all cities. However, the decline in NO₂ concentrations attributable to the lockdowns was not as large as expected, at reductions of 10 to 50%. Accordingly, O₃ increased by 2 to 30% (except for London), the total gaseous oxidant (O_x = NO₂ + O₃) showed limited change, and PM_{2.5} concentrations decreased in most cities studied but increased in London and Paris. Our results demonstrate the need for a sophisticated analysis to quantify air quality impacts of interventions and indicate that true air quality improvements were notably more limited than some earlier reports or observational data suggested.