

Limited Regional Aerosol Changes Despite Unprecedented NO₂ Decline During the February Coronavirus Shutdown in China

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Following the emergence of a novel coronavirus in Wuhan, the People's Republic of China instituted a number of strict lockdown and more general socio-economic shutdown measures throughout the country starting in late January and continuing into February 2020 in order to arrest the spread of the disease. This resulted in a sharp economic contraction unparalleled in recent Chinese history. Satellite remote sensing shows that nitrogen oxide pollution declined by an unprecedented amount (~50% regionally) from its expected unperturbed value, but regional-scale column aerosol loadings and cloud microphysical properties were not detectably affected. The disparate impact may be tied to differential economic impacts of the shutdown, in which the transportation sector, a disproportionate source of nitrogen oxide emissions, underwent drastic declines (~90% reductions in passenger traffic), whereas industry and power generation, responsible for >90% of particulate emissions, were relatively less affected (~10% reductions in electricity and thermal power generation). Meteorology (particularly warm temperatures) and non-linear chemical reactions also likely played a role in driving the disparity.

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