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## Impact of lockdowns implementations on CO concentration in Brazil during March 2020

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With the rapid emergence of the novel coronavirus disease 2019 (COVID-19), several lockdowns measures have been used to control the spread of the coronavirus around the world. The restrictions imposed by the lockdowns include partial or complete closure of international borders, schools, and nonessential businesses and, in some cases, restricted citizen mobility. Besides the effect on controlling the virus spread, the associated reduction in traffic and industry has revealed an unprecedented impact on global air pollution. Here we evaluate the impact of the lockdowns on CO concentration in Brazil on a national scale. We use data from Modern-Era Retrospective analysis for Research and Applications, Version 2 (MERRA-2) to analyze the low, median, and higher concentrations of CO in March 2020 compared to the same month in the last 20 years (2000-2019). In March, many Brazilian states declared public health emergency imposing several partial to total lockdowns. Our results reveal that the lockdowns did not reduce the lowest concentrations, since the 25th percentile from March 2020 was approximately 15% higher than the same period from 2000-2019. We observe a decrease in the 90th percentile values from March 2020 when compared to March 2000-2019, suggesting that the lockdowns reduced the highest concentrations which are strongly related to health effects. The 90th percentile concentration of CO in March 2020 was smaller in 50% of the pixels, representing up to 140% of reduction. Spatially, we have observed the maximum reduction due to the lockdowns in the southern and southeast coast, as well as in Roraima state. Lockdowns have also affected the median concentration of CO, reducing the concentration by 70% for 32% of the pixels. Our results confirm the positive impact of the lockdowns on the air quality in Brazil, contributing to mounting evidence that lockdowns and restricting vehicular activities would be an effective way to control the air pollution.