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A note on the effect of COVID-19 lockdown on air pollution

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Is Delhi enjoying better air quality?

A note on the effect of COVID-19 lockdown on air pollution

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The global spread of COVID-19 has restricted the anthropogenic activities across the world. This has led to some unexpected alterations in the environment. As industries, transport networks, and businesses have closed down, it has brought an improving trend of air quality in polluted regions. In India, the nationwide lockdown has been implemented on 24th March 2020. The lockdown restrictions on more than 1.3 billion people have brought unique changes in the air quality. This study analyses the levels of three major pollutants (PM_{2.5}, PM₁₀, and NO₂) before and during the lockdown in Delhi using secondary data derived from the Central Control Room for Air Quality Management, Delhi.

The data of concentration of PM_{2.5}, PM₁₀, and NO₂ have been derived from 38 ground stations dispersed within the city. The spatial interpolation maps of pollutants for two times are generated using Inverse Distance Weighting (IDW) model. The results indicate the lowering of PM_{2.5}, PM₁₀, and NO₂ concentrations in the city by 93% (Figure 1 and 2), 83% (Figure 3 and 4), and 70% (Figure 5 and 6) from 25th February 2020 to 21st April 2020.

Particles with a diameter of less than 10 microns (PM₁₀), including fine particles less than 2.5 microns (PM_{2.5}) pose the greatest risks to health, as they are capable of penetrating peoples' lungs and entering their bloodstream causing cardiovascular, cerebrovascular and respiratory illness and death of nearly three million people globally (GBD 2018). In 2013, PM₁₀ was classified as a cause of lung cancer by the WHO's International Agency for Research on Cancer (IARC 2013). It is also the most widely used indicator to assess the health effects of exposure to ambient air pollution. Further, acute to chronic exposure to

NO₂ have harmful effect on the respiratory system, further causing breathing problems and occasional deaths (Khaniabadi et al. 2017).

It is found that before one month of the lockdown, the levels of air quality in Delhi were 'critically high' and far beyond the guideline values set by the World Health Organization-2006. The lockdown in the city has enhanced the air quality as shown in the following maps that indicates the change in air quality before and during lockdown. As the data indicates, over the two months (25th Feb to 21st April), the levels of air pollution has reduced substantially. Considering the critically degraded air quality for decades and health complications associated with unhealthy air in Delhi, the improvement in air quality due to lockdown is a boon for the people of Delhi.

We can thoughtfully say that the improvements in air quality are likely to be short-term. Yet, the current analysis indicates a spark of hope. In order to tackle the usual level of high pollution in Delhi, serious measures need to be enacted at policy level.

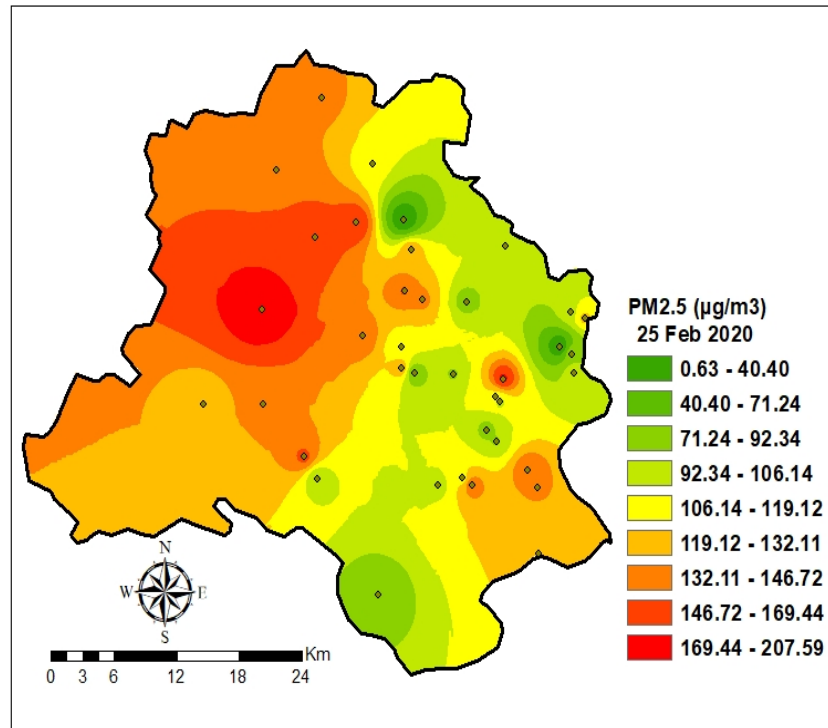


Figure 1 PM_{2.5} concentrations in Delhi before COVID-19 lockdown (25 February 2020)

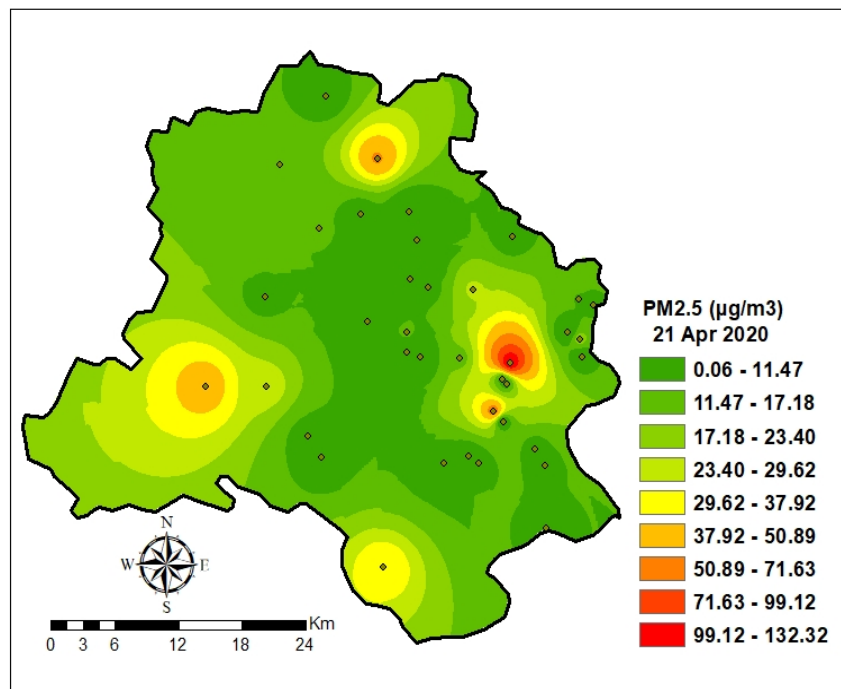


Figure 2 PM_{2.5} concentrations in Delhi during COVID-19 lockdown (21 April 2020)

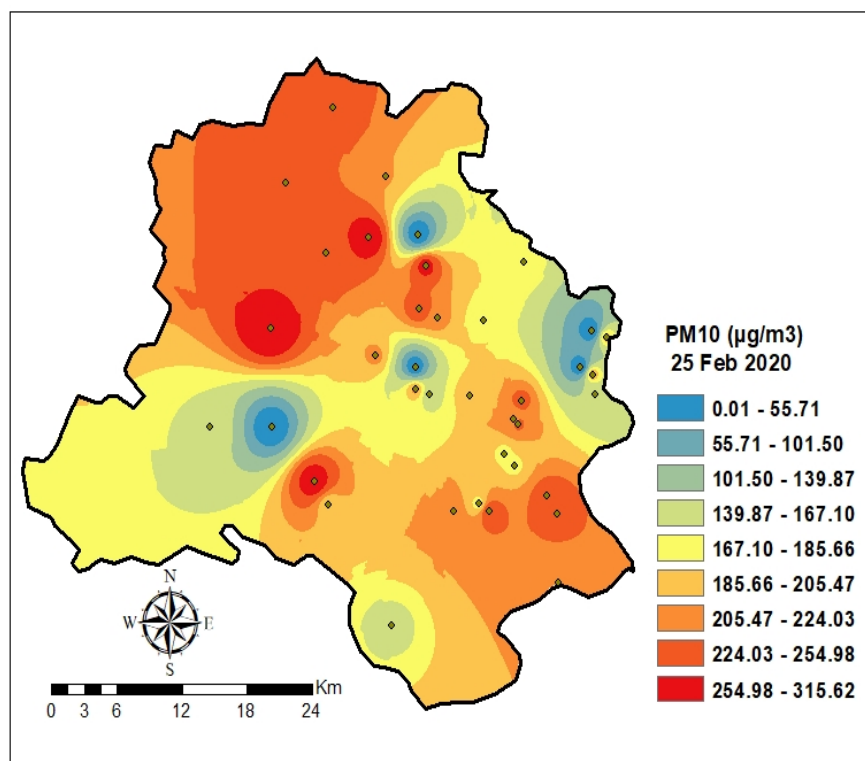


Figure 3 PM₁₀ concentrations in Delhi before COVID-19 lockdown (25 February 2020)

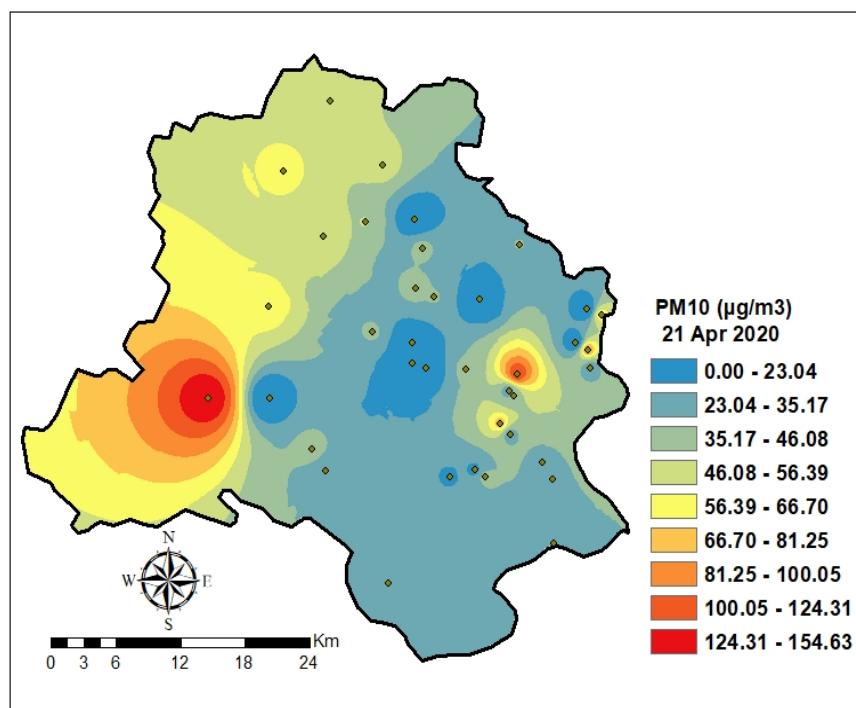


Figure 4 PM₁₀ concentrations in Delhi during COVID-19 lockdown (21 April 2020)

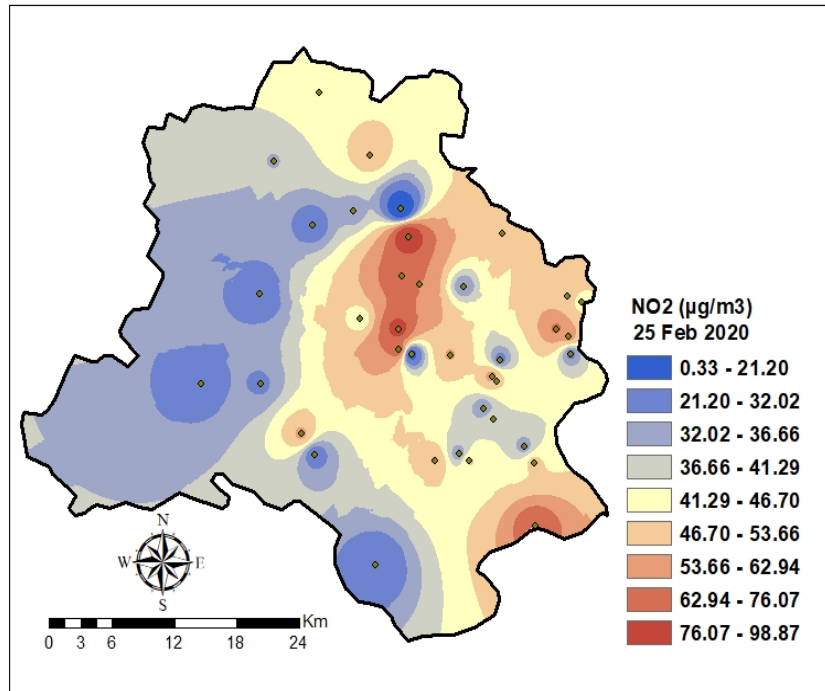


Figure 5 NO₂ concentrations in Delhi before COVID-19 lockdown (25 February 2020)

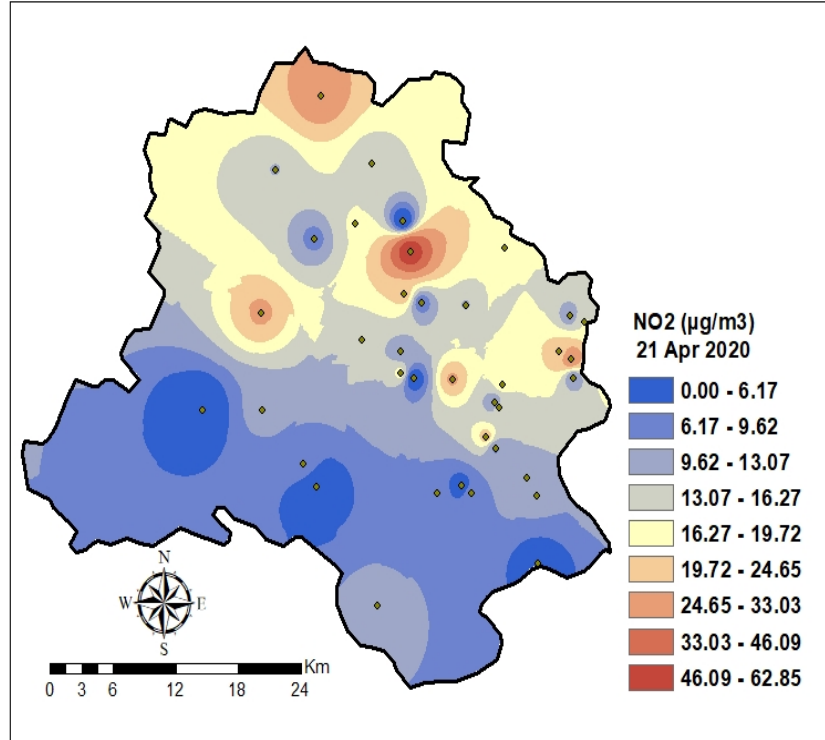


Figure 6 NO₂ concentrations in Delhi during COVID-19 lockdown (21 April 2020)

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References:

- GBD 2017 Risk Factor Collaborators. (2018). Global, regional, and national comparative risk assessment of 84 behavioural, environmental and occupational, and metabolic risks or clusters of risks for 195 countries and territories, 1990–2017: a systematic analysis for the Global Burden of Disease Study 2017. *Lancet* (London, England), 392(10159), 1923. [https://doi.org/10.1016/S0140-6736\(18\)32225-6](https://doi.org/10.1016/S0140-6736(18)32225-6).
- IARC (International Agency for Research on Cancer). (2013). Air Pollution and Cancer. IARC Scientific Publication No. 161. Lyon, France: World Health Organization. Available: www.iarc.fr/en/publications/books/sp161/AirPollutionandCancer161.pdf . Accessed 25 April 2020
- Khaniabadi, Y. O., Goudarzi, G., Daryanoosh, S. M., Borgini, A., Tittarelli, A., & De Marco, A. (2017). Exposure to PM 10, NO 2, and O 3 and impacts on human health. *Environmental science and pollution research*, 24(3), 2781-2789.
- World Health Organization. (2006). WHO Air quality guidelines for particulate matter, ozone, nitrogen dioxide and sulfur dioxide: global update 2005: summary of risk assessment (No. WHO/SDE/PHE/OEH/06.02). Geneva: World Health Organization.