

# **Multi-year Comparison of Air Quality during the Diwali period**

**by**

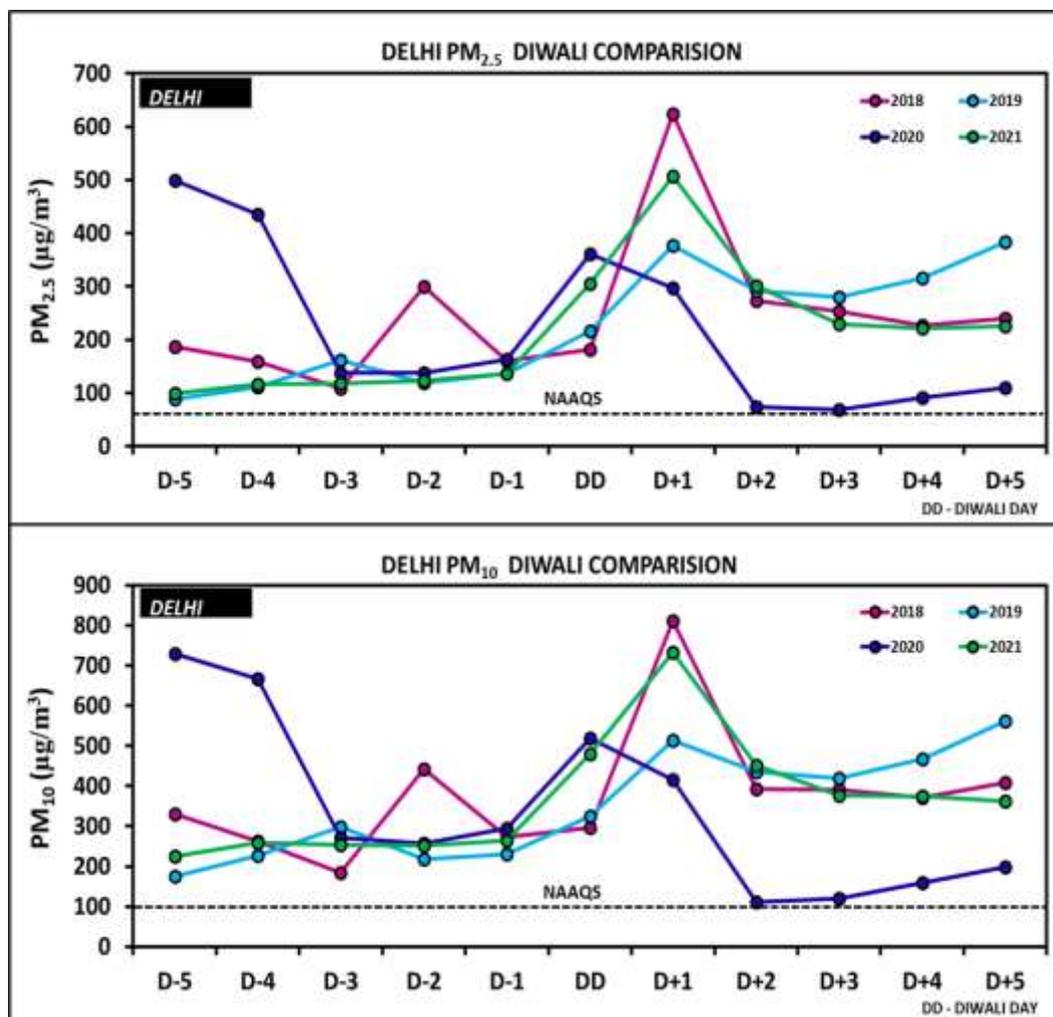
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The status of air quality in the four metropolitan cities during the Diwali period is determined by multiple factors viz., Additional local emissions from fire crackers, transport of stubble burning emissions (for Delhi), local weather as well as large scale circulations, etc. Air quality is expected to deteriorate on the following day of Diwali due to emissions from fire crackers the previous night. Concentration of particulate matter (PM<sub>2.5</sub> and PM<sub>10</sub>) depends on the magnitude of emissions on the night of Diwali and the static stability of the boundary layer, mixing layer height and surface wind speed on the following day. Weather plays an important role in controlling air quality through wet scavenging (rainfall) or dispersion (due to high winds) or convection (due to high solar radiation) causing year to year variability during the Diwali period. The following figures illustrate the variation of PM<sub>2.5</sub> and PM<sub>10</sub> in Delhi, Mumbai, Pune and Ahmedabad during the Diwali period (5 days before and 5 days after Diwali) for the last 4 years in comparison with that of 2021. In the figures below NAAQS indicates National Ambient Air Quality Standard.

## DELHI

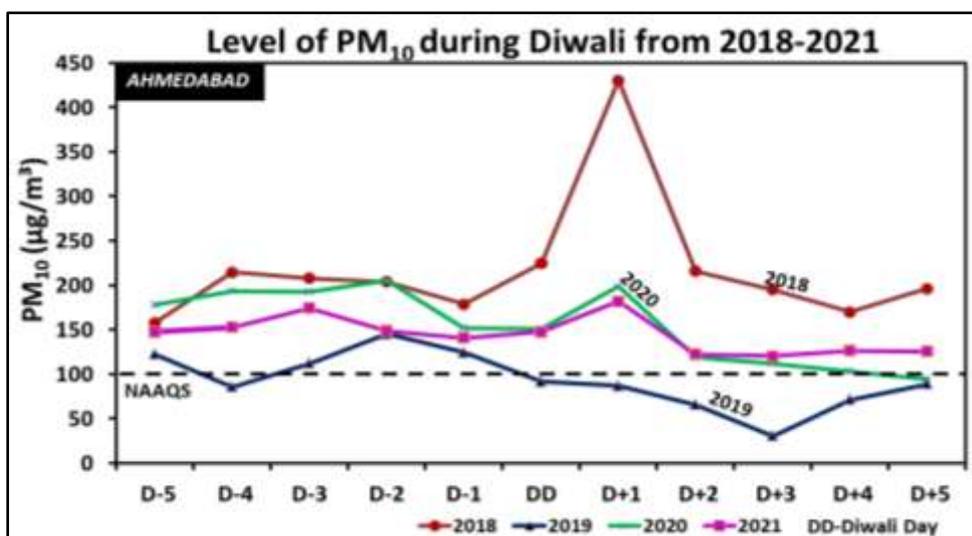
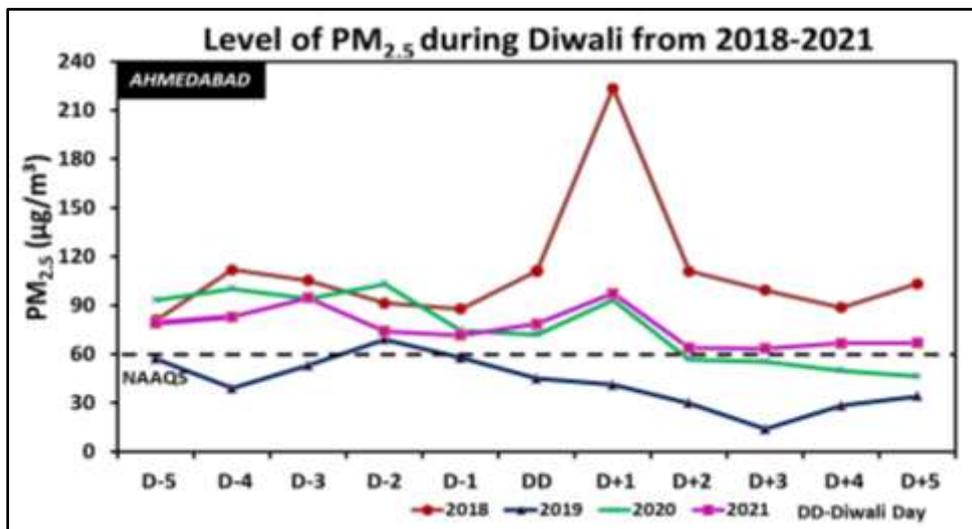
The PM<sub>10</sub> and PM<sub>2.5</sub> concentration in Delhi during the Diwali period in 2021 was higher as compared to that in the previous two years but slightly lower than that in the year 2018. The AQI during the Diwali period remained in the Severe category in Delhi. The PM concentration started to increase from 7 pm onwards on the Diwali Day (4<sup>th</sup> Nov) and reached peak at 2 am on 5<sup>th</sup> Nov and then started to reduce gradually. The PM<sub>2.5</sub> concentration increased by 3.5 times from 7 pm on 4<sup>th</sup> to 2 am on 5<sup>th</sup>. The higher concentration of PM during the Diwali period is due to high local emissions combined with the biomass burning effect. Calm surface winds and moderate mixing layer height lead to poor ventilation resulting in accumulation of pollutants.



Delhi's PM<sub>2.5</sub> (top) and PM<sub>10</sub> (bottom) concentration during Diwali period

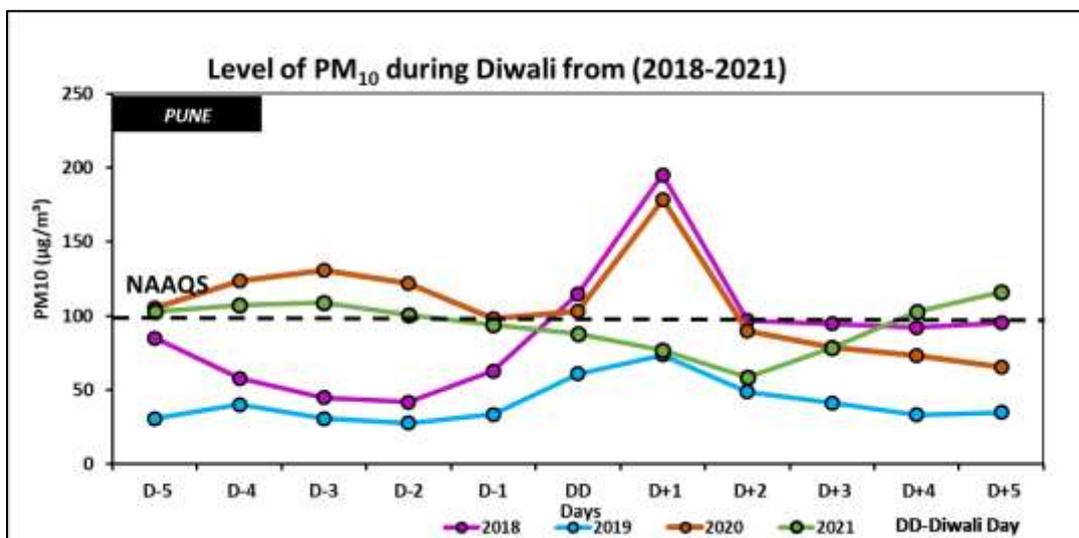
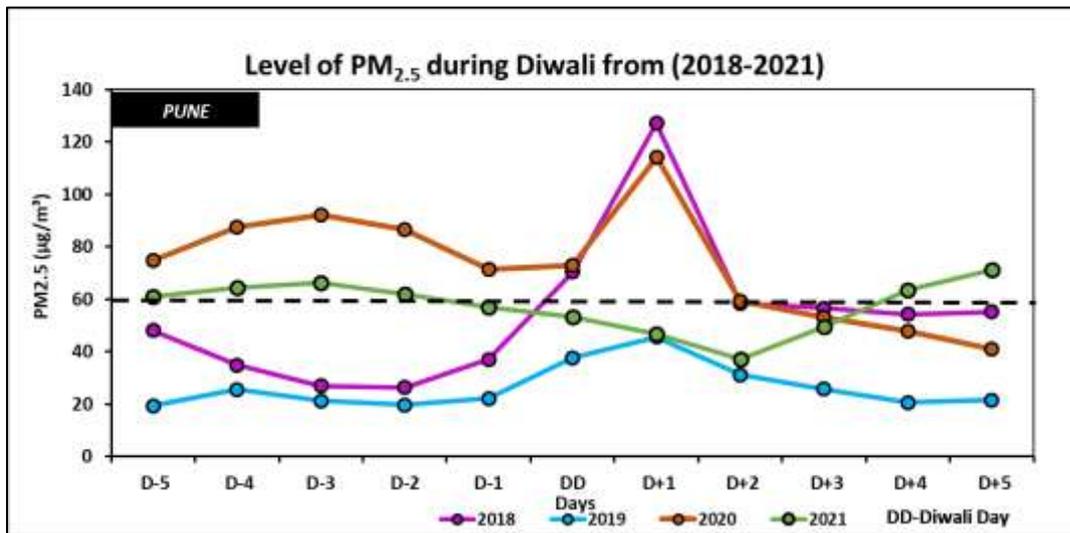
## AHEMDABAD

Ahmedabad witnessed POOR (upper range of poor) air quality on the next day of Diwali 2021 with PM<sub>2.5</sub> level reaching 97  $\mu\text{g}/\text{m}^3$  which is slightly higher than that observed in 2020 (93  $\mu\text{g}/\text{m}^3$ ). Diurnal (hourly) variation of PM<sub>2.5</sub> indicates that the early morning hours of November 5th (0100 hrs to 0500 hrs) were the hot spot hours, with AQI levels ranging from very poor to severe. In the year 2018, air quality was in the very poor category on the next of Diwali, with a concentration of 223 $\mu\text{g}/\text{m}^3$  while on the Diwali day it was 111 $\mu\text{g}/\text{m}^3$ , indicating poor air quality. The year 2019 was the cleanest Diwali in the last four years, with a PM<sub>2.5</sub> concentration of 41 $\mu\text{g}/\text{m}^3$ .



# PUNE

The PM10 and PM2.5 concentration in Pune during the Diwali period of 2021 was lower as compared to the years 2018 and 2020 due to the rainfall activity over the city. In the year 2019 Pune witnessed rainfall during the Diwali period and hence the concentration levels remained low. However, the concentration in the year 2021 was observed to be higher than the year 2019 on the whole. It is observed that the concentration in the year 2021 was above the NAAQS five days prior to Diwali day, however on the DD and the post Diwali day the concentration lowered considerably due to rainfall. As opposed to the previous years the PM concentration did not peak this year. The hourly concentration of PM however was observed to increase from 10 pm in the night of the DD and it peaked at 12 am (79  $\mu\text{g}/\text{m}^3$ ) and then further decreased. The air quality on DD and post Diwali day remained in the SATISFACTORY category and further from D+4 (i.e., fourth day after Diwali) the AQI is observed to be in the moderate category.



# MUMBAI

In Mumbai, air pollution levels increased during the 2021 Diwali period compared to the past 2019 and 2020. On Diwali Day (4<sup>th</sup> November), observed PM<sub>2.5</sub> concentration was 79  $\mu\text{g}/\text{m}^3$  (AQI = 163), which falls in the moderate category, and Post Diwali day (5<sup>th</sup> November), PM<sub>2.5</sub> concentration is 82  $\mu\text{g}/\text{m}^3$  (AQI = 173), which also falls in the moderate category. Due to the low-pressure system in the central Arabian sea, light rain was observed over the Mumbai regions. These weather conditions worked positively to keep air quality in the satisfactory range. On 6<sup>th</sup> November, PM<sub>10</sub> and PM<sub>2.5</sub> showed a decrease and air quality is in the satisfactory category up to 7<sup>th</sup> November. In Mumbai, the highest levels of PM<sub>10</sub> and PM<sub>2.5</sub> were recorded between 11 pm and 3 am on the night of 4- 5<sup>th</sup> November.

