

Mystery over the Haze during 1st week of November 2019 in Delhi-NCR

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Abstract

As the haze engulfed the Delhi NCR after Diwali there is a panic in public about its causes and consequences. Here are some facts and figures to know the truth behind the scene. Temperature fell down from 24°C on October 31 to 21°C on November 2 as recorded at UPPCB station at sector-125, Noida which is adjacent to Delhi a very strategic location and can be considered as reference point for Delhi-NCR. The details of the study conducted is given below.

Keywords: Diwali, Air Pollution, Haze

Introduction

With low temperature, high humidity of 72% and less sunlight turned the polluted air into haze because of formation of water micelles around the dust/pollutant. Sweeping of the ash produced by firecracker burning has suspended the particulate Matter (PM) in the atmosphere, in fact this may be the most probable cause of high levels of PM_{2.5} and PM₁₀. In addition, the wind flow in North West Direction indicate air pollution from parts of Haryana and Punjab possibly due to stubble burning which pump huge amount of fire smoke.

Materials and Methods

Study Area:

The measurement site is located at Sector 125, Noida (Amity University campus)

Latitude: 28.541577°N

Longitude: 77.33870°E

Equipment:

Continuous Ambient Air Quality Monitoring Station(CAAQMS)

- The Ambient Air Quality was measured by CAAQMS Unit installed by Ecotech for UPPCB
- The concentration of PM₁₀ and PM_{2.5} were recorded based on the principle of Beta Attenuation Method.

Result and Discussion

The Readings from strategic location of Sector 125, Noida clearly indicates that there is rise PM_{10} and $PM_{2.5}$ as shown in figure on Nov 2, the PM_{10} reached 684.07 microgram cubic meter against the permissible limit of 100 microgram per cubic meter. Similarly, $PM_{2.5}$ level was also nearly 10 times the permissible limit at 437.54 microgram per cubic meter.

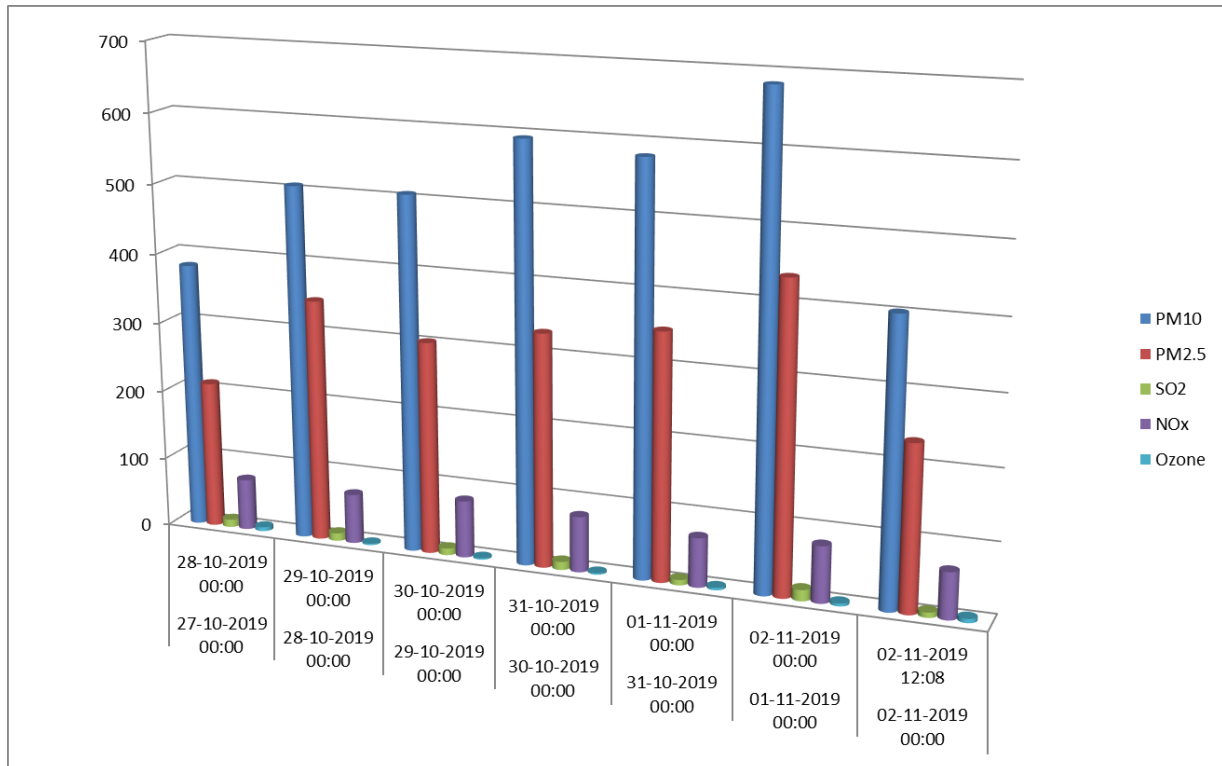


Figure:1 Concentration of various pollutants at sector 125, Noida

Exposure to high level of PM_{10} and $PM_{2.5}$ can lead to a number of health impacts ranging from coughing and wheezing to asthma and bronchitis to high blood pressure, heart attack, strokes and premature death. In current situation, poor visibility due to automobile traffic on roads again adds to pollution. Therefore, use of public transport must be promoted in such situations in peak hours.

Table 1. Permissible limit of various pollutants

Permissible limit(Industrial, Residential, Rural and Other Areas)					
PM <2.5	PM <10	CO	Oxides of N ₂	SO ₂	O ₃

$\mu\text{g}/\text{m}^3$	$\mu\text{g}/\text{m}^3$	mg/m^3	$\mu\text{g}/\text{m}^3$	$\mu\text{g}/\text{m}^3$	$\mu\text{g}/\text{m}^3$
60	100	4	80	80	180

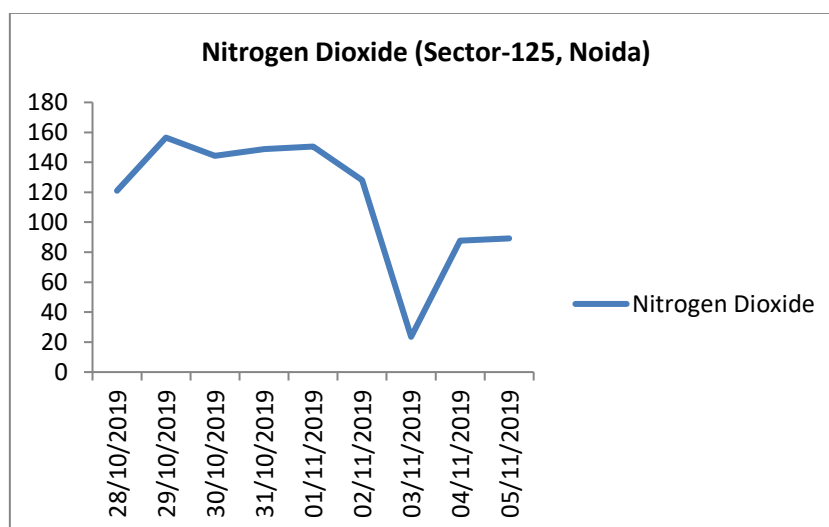


Figure:2 Concentration of NO₂ at sector 125, Noida

Also there is increase in NO₂ levels which indicates vehicular and industrial pollution which are the main sources of NO₂ emission. The cooler temperature due to sudden fall by 3°C and calm wind around with low wind speed and high humidity, pollutants are getting trapped from local sources and hanging low favouring severe pollution. All the sudden changes resulted in elevation in levels of PM_{2.5} and PM₁₀.



Figure: 3 Satellite Image (Courtesy: NASA)

The Moderate Resolution Imaging Spectroradiometer (MODIS) on NASA's Aqua satellite captured this natural-colour image on the afternoon of November 4, 2019. Plume of smoke that had been emitted a few days earlier was sweeping through Delhi and Kanpur is clearly visible in the image.

Mitigation Solutions

- Washing of the roads instead of sweeping to avoid dust/ash, sprinkling of water as public private initiative
- Developing infrastructure covering gap between roads and pavement to avoid dust
- Regulation of cover bare area with grass, pebbles and straw etc. in public private places
- Enriching diet having antioxidants and building immunity.
- Ghee can be applied in Nostril to trap the dust particles, this is also suggested for sinus problem
- Using indoor plant which provide surface area to absorb dust and release oxygen, eight indoor plants releasing oxygen at night are Spider Plant, Snake Plant, Peace Lily, Pothos, Weeping Fig, Philodendrones, Aloe Vera, Chrysanthemum.
- "Say No to Fire Crackers" instead of bursting Fire Crackers to combat air pollution for good health.

Reference

1. <https://app.cpcbccc.com/ccr/>
2. <https://giovanni.gsfc.nasa.gov/giovanni/>