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Air Pollution Trends in India Past 10 Years

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INTRODUCTION

The major problem in INDIA is the decrease in air quality and this trend has been in increasing drift from the past years in the major cities of INDIA. The significant reasons for this are a rapid increase in population and acreage, of which there is a substantial demand for personnel and public transport which keeps the environment of a certain city in the crux.

The air pollutants in the major cities of INDIA exceed the NATIONAL AMBIENT AIR QUALITY STANDARDS (NAAQS). (Guttikunda, Goel et al. 2014). The pollutants include gaseous contaminant which might be noxious gaseous pollutants and organic gaseous pollutants such as hydrocarbons and particulate matter which might be in the form of suspended particulate matter or Respirable suspended particulate matter (particle size less than 10 micrometres. Hence, it is also called particulate matter 10).(Organization 2003)

NATIONAL AMBIENT AIR QUALITY STANDARDS (NAAQS)

According to National Ambient Air Quality Standards the standard values for particulate matter 10, SO_x, NO_x are as follows:

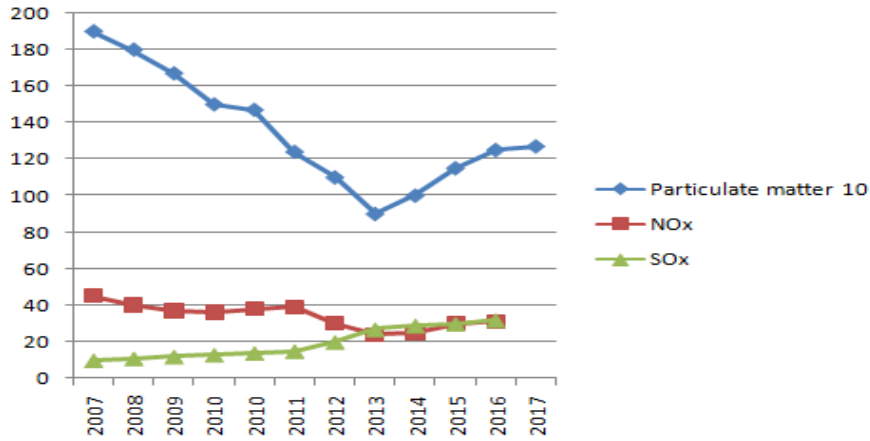
| | |
|------------------------------|-----------------------------|
| NO _x | 40 microgram/m ³ |
| SO _x | 50 microgram/m ³ |
| Particulate Matter 10(PM-10) | 60 microgram/m ³ |

(Kamyotra, Basu et al. 2012)

AIR QUALITY TRENDS FOR DIFFERNT STATES

1. GUJARAT

The Air quality trends for the past ten years have been depicted in the graph between years (X-axis) VS Concentration (Y-axis) as shown below as follows:



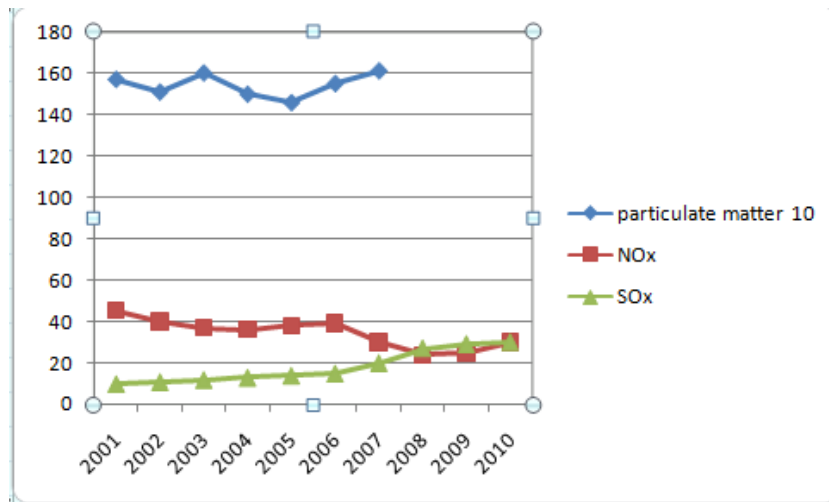
Analysis

From the graph, it is evident that the particulate matter 10 has been showing a last declining trend in the year 2014. However, it started to rise up from 2015.

The SOx and NOx have been showing the equal trend and the values of SOx and NOx are very minimal in quantity when compared to particulate matter 10.

2. HARYANA

The Air quality trends for Haryana in the ten years have been depicted in the graph between years (X-axis) VS Concentration (Y-axis) as shown below as follows:

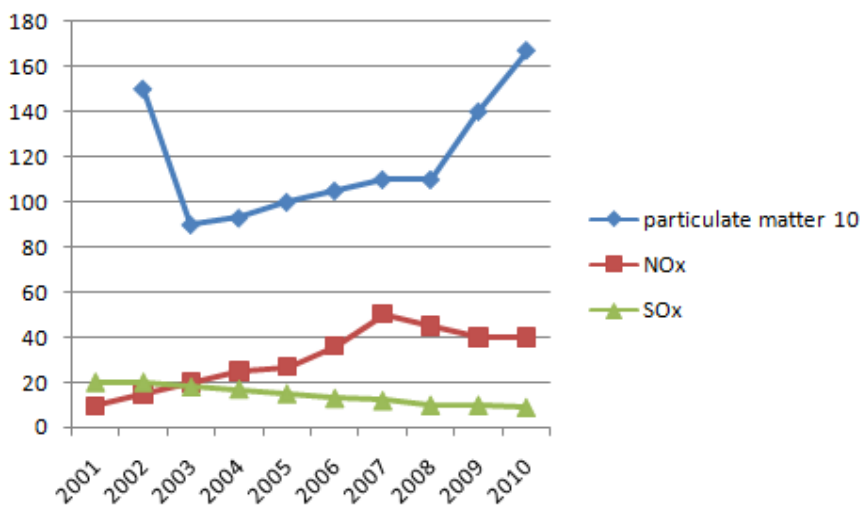
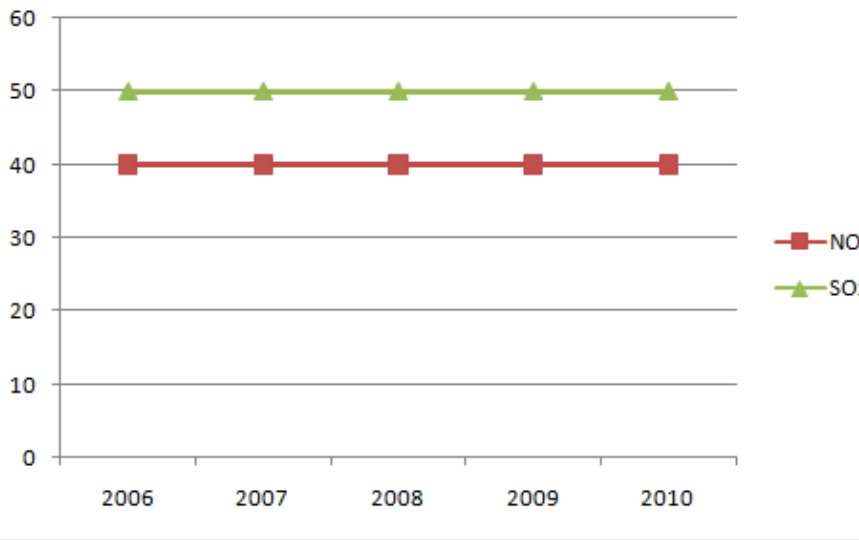
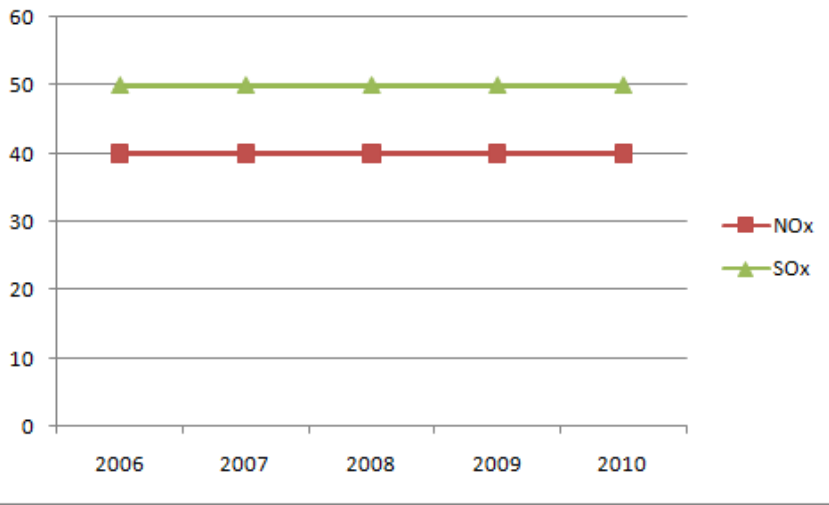


ANALYSIS

From the graph, it is evident that the particulate matter 10 is showing the steeping increase whereas, the SOx and NOx gases are showing the declining trend.

3. PUNJAB

The Air quality trends for Punjab in the ten years have been depicted in the graph between years (X-axis) VS Concentration (Y-axis) as shown below as follows:

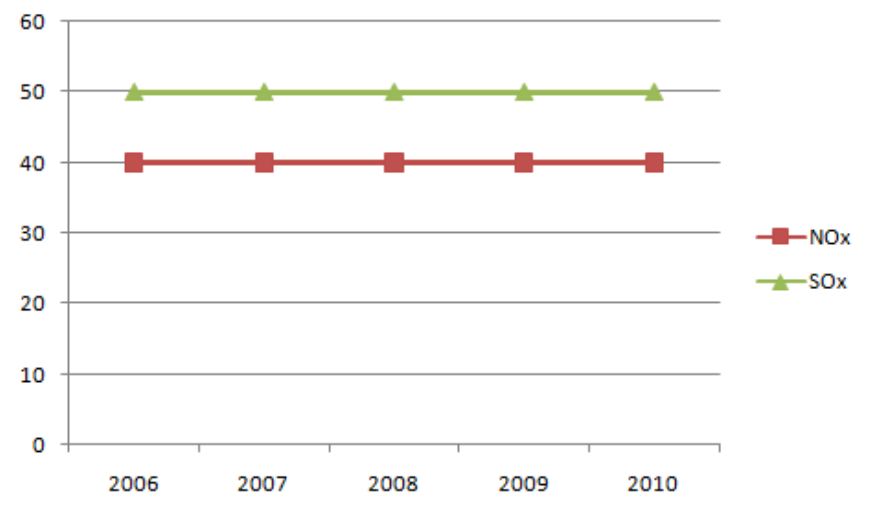


ANALYSIS

The NOx show an irregular trend and is going well above the required National Ambient Air Quality Standards. The SOx is showing a regular trend. However, the particulate matter 10 is showing an increasing trend from 2008.

4. JHARKHAND

The Air quality trends for Jharkhand in the ten years has been depicted in the graph between years (X-axis) VS Concentration (Y-axis) as shown below as follows:

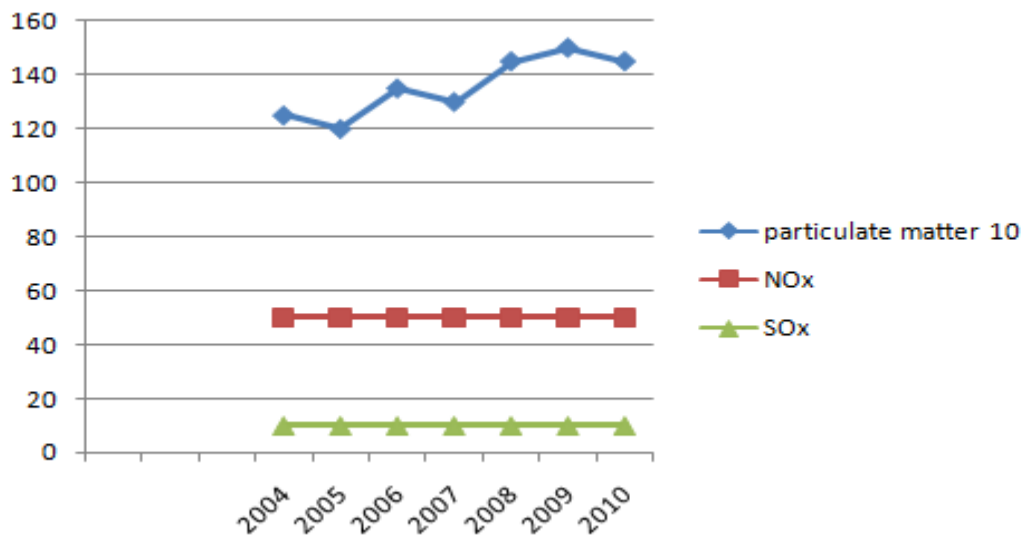


ANALYSIS

The SOx and NOx are well within the National Ambient Air Quality Standards.

5. WEST BENGAL

The Air quality trends for West Bengal in the ten years has been depicted in the graph between years (X-axis) VS Concentration (Y-axis) as shown below as follows:

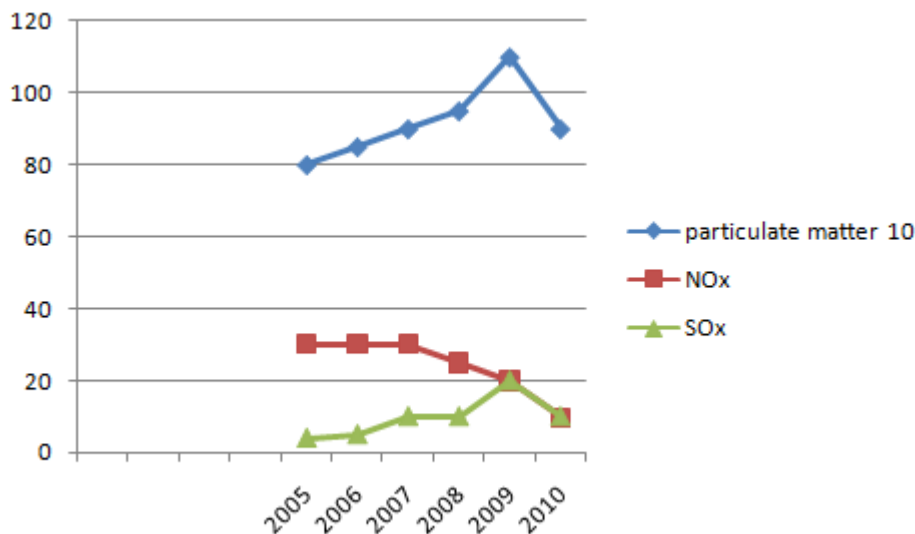


ANALYSIS

The NOx and SOx show a regular trend and are well within the National Ambient Air Quality Standards. However, the particulate matter 10 is showing an irregular trend.(Bhavan 2000)

6. ANDHRA PRADESH

The Air quality trends for Andhra Pradesh in the ten years has been depicted in the graph between years (X-axis) VS Concentration (Y-axis) as shown below as follows:

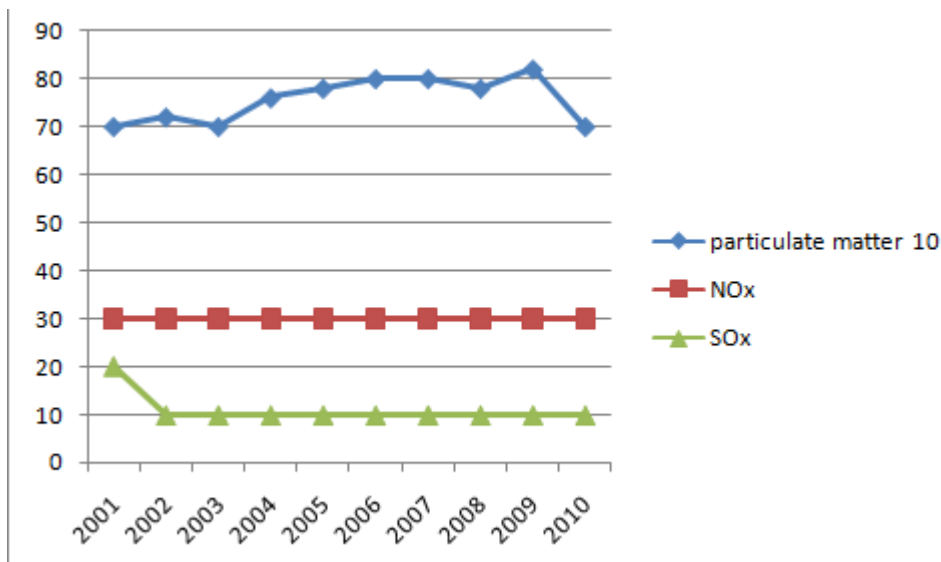


ANALYSIS

The NOx and SOx show a regular trend and are well within the National Ambient Air Quality Standards. However, the particulate matter 10 is showing an irregular trend.

7. TELANGANA

The Air quality trends for Telangana in the ten years has been depicted in the graph between years (X-axis) VS Concentration (Y-axis) as shown below as follows:

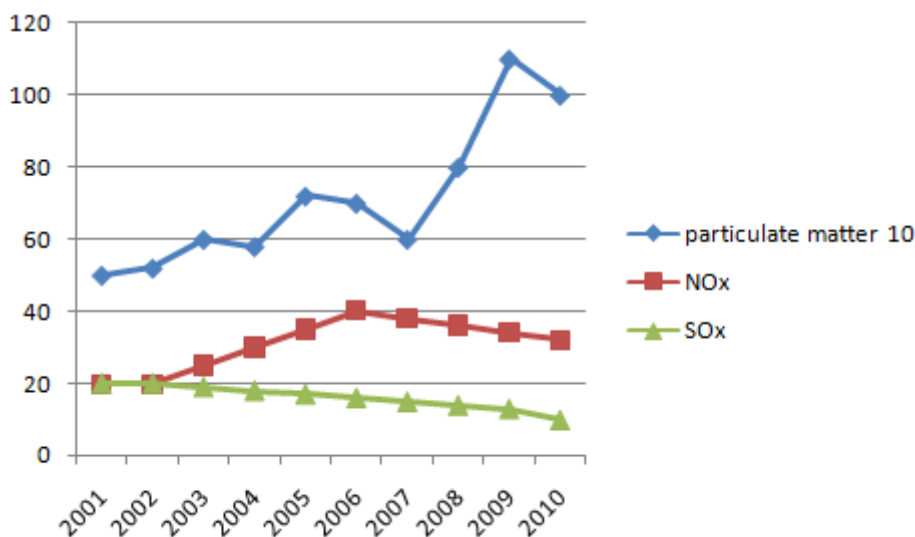


ANALYSIS

The NOx and SOx show a regular trend and are well within the National Ambient Air Quality Standards. However, the particulate matter 10 is showing an irregular trend.

8. KARNATAKA

The Air quality trends for Karnataka in the ten years has been depicted in the graph between years (X-axis) VS Concentration (Y-axis) as shown below as follows:

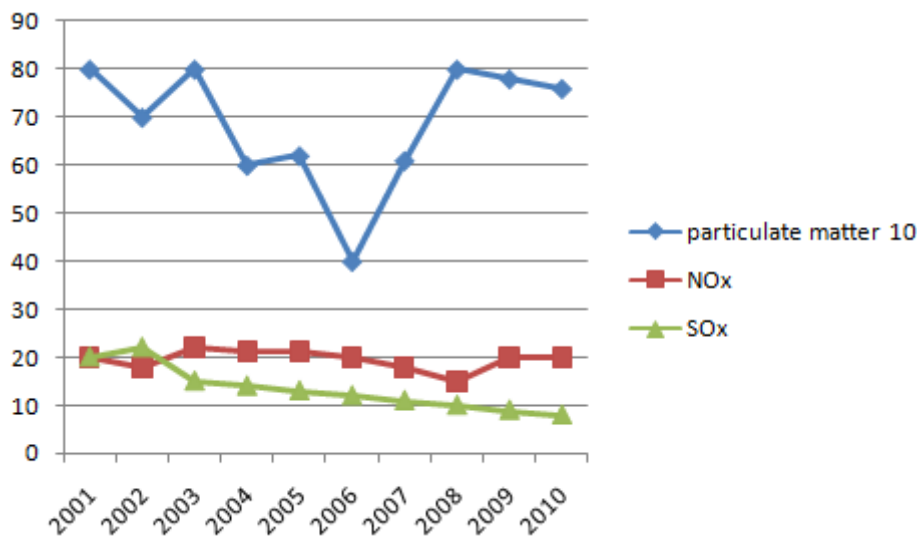


ANALYSIS

The NOx and SOx show an irregular trend but are well within the National Ambient Air Quality Standards. However, the particulate matter 10 which is also showing a showing an irregular trend is not under National Ambient Air Quality Standards.

9. TAMIL NADU

The Air quality trends for Tamil Nadu in the ten years has been depicted in the graph between years (X-axis) VS Concentration (Y-axis) as shown below as follows:

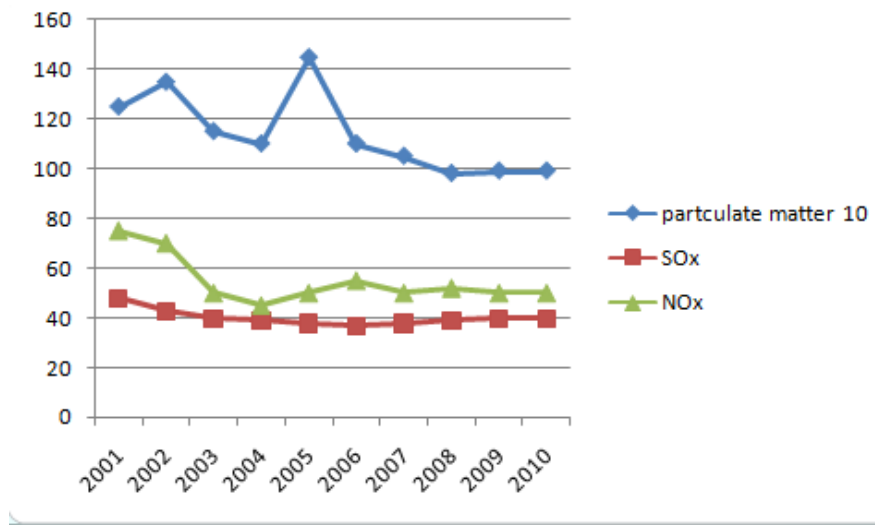


ANALYSIS

The NOx and SOx show an irregular trend but are well within the National Ambient Air Quality Standards. However, the particulate matter 10 which is also showing a showing an irregular trend is not under National Ambient Air Quality Standards and from the graph it can be observed that there is a rapid increase in particulate matter 10 from the year 2006.

10. MAHARASTRA

The Air quality trends for Maharashtra in the ten years have been depicted in the graph between years (X-axis) VS Concentration (Y-axis) as shown below as follows:

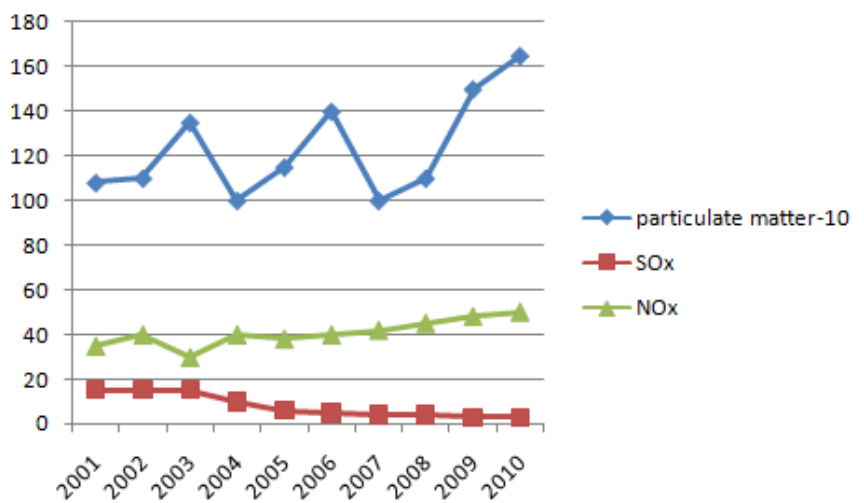


ANALYSIS

SOx and NOx gases show a steady trend while the particulate matter-10 show a decreasing trend. However, it is not under National Ambient Air Quality Standards.

11. RAJASTAN

The Air quality trends for RAJASTAN in the ten years has been depicted in the graph between years (X-axis) VS Concentration (Y-axis) as shown below as follows:

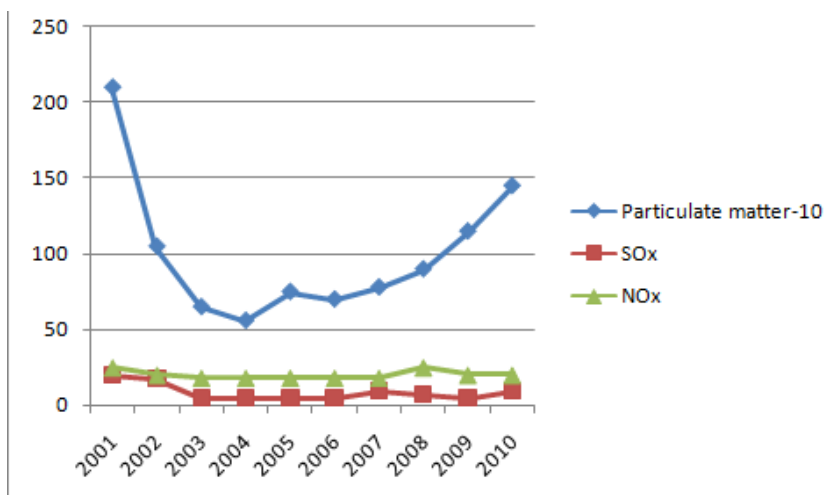


ANALYSIS

SOx shows a decreasing trend but are well within National Ambient Air Quality Standards and NOx gases show an increasing trend while the particulate matter-10 shows an increasing trend. However, it is not under National Ambient Air Quality Standards.

12. MADHYA PRADESH

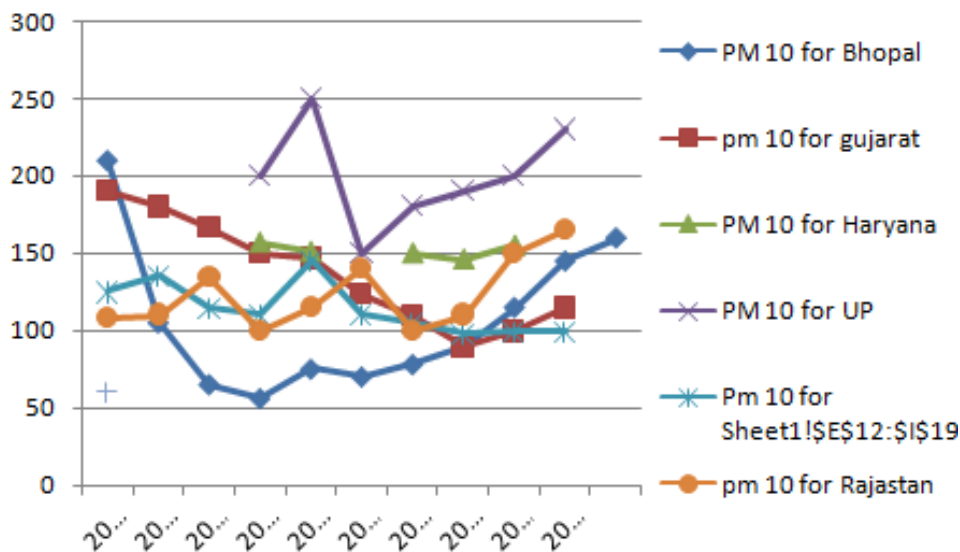
The Air quality trends for MADHYA PRADESH in the ten years have been depicted in the graph between years (X-axis) VS Concentration (Y-axis) as shown below as follows:



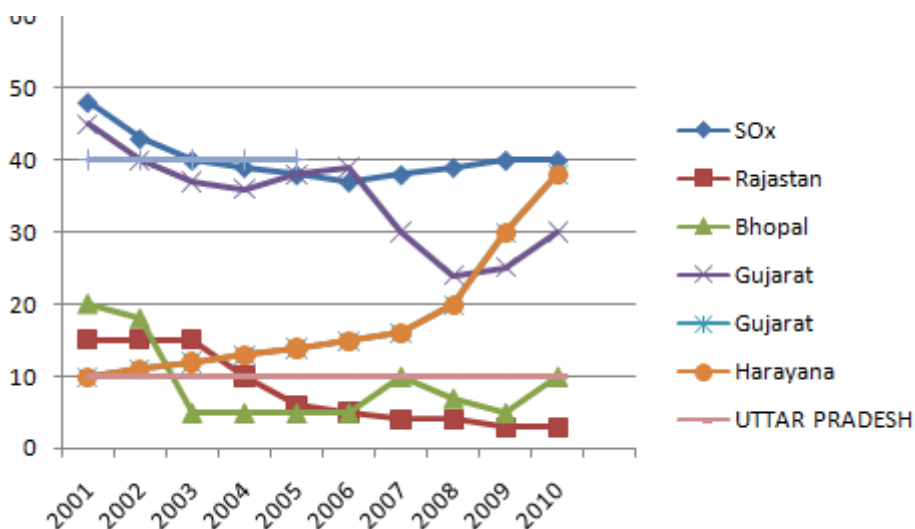
ANALYSIS

SOx shows a steady trend and is well within National Ambient Air Quality Standards and NOx also shows a gas shows a steady trend while the particulate matter-10 shows a steep decreasing trend.

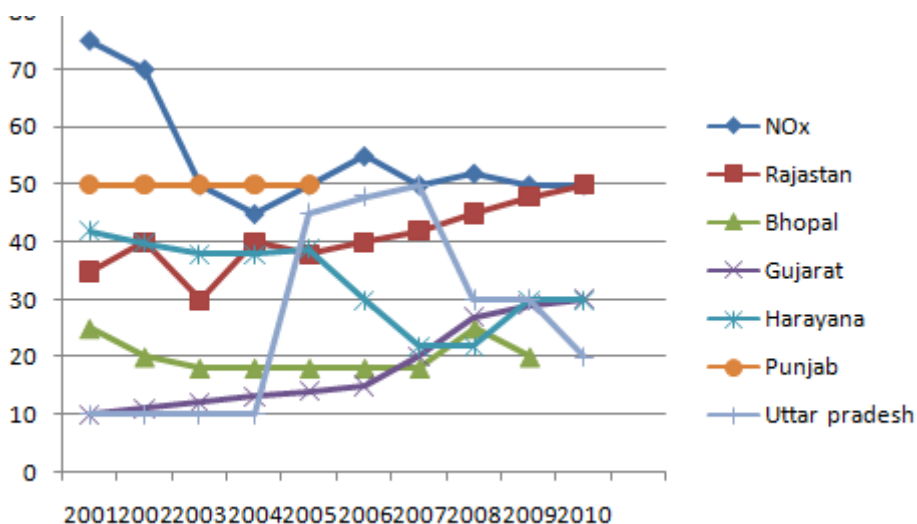
GRAPH FOR PARTICULATE MATTER-10 INCLUDING ALL STATES



GRAPH FOR SO_x INCLUDING ALL STATES



GRAPH FOR NO_x INCLUDING ALL STATES



EMISSION OF PARTICULATE MATTER 2.5 MICROGRAM/m³ ACROSS THE INDIA IN 2016

| | |
|----------------|------------------------------|
| DELHI | 153 MICROGRAM/m ³ |
| BIHAR | 149 MICROGRAM/m ³ |
| MADHYA PRADESH | 144 MICROGRAM/m ³ |
| CHATTISGARH | 134 MICROGRAM/m ³ |
| GUJARAT | 100 MICROGRAM/m ³ |
| UTTAR PRADESH | 96 MICROGRAM/m ³ |
| PUNJAB | 92 MICROGRAM/m ³ |
| AMRITSAR | 86 MICROGRAM/m ³ |

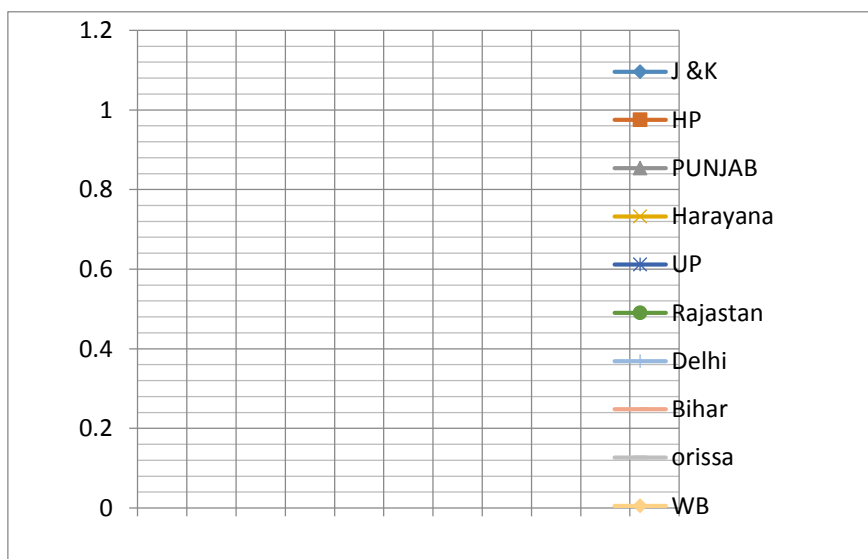
EMISSION OF CARBON-DI-OXIDE IN DIFFERENT INDIAN STATES FOR PAST 10 YEARS

(Reddy and Venkataraman 2002)

| EMISSION OF CO2 ACROSS DIFFERENT STATES SINCE LAST 10 YEARS | | | | | | | | | | |
|---|--------|--------|--------|---------|-------|----------|-------|--------|--------|-------|
| YEAR | J &K | HP | PUNJAB | Haryana | UP | Rajastan | Delhi | Bihar | Orissa | WB |
| 1998 | 569.95 | 488 | 9392 | 5532 | 40046 | 7960 | 4018 | 29905 | 13546 | 17753 |
| 1999 | 588.9 | 682 | 11012 | 5250 | 44122 | 7562 | 5129 | 23184 | 15957 | 23457 |
| 2000 | 696.48 | 659 | 10845 | 5460 | 44268 | 8929 | 6033 | 24062 | 16172 | 23363 |
| 2001 | 626.89 | 875 | 11663 | 6667 | 43267 | 9959 | 3033 | 31017 | 15031 | 23693 |
| 2002 | 602.29 | 877 | 11473 | 7194 | 44452 | 11543 | 5493 | 22036 | 17044 | 24366 |
| 2003 | 608.57 | 857 | 1189 | 7495 | 45451 | 12643 | 5838 | 21485 | 21611 | 27362 |
| 2004 | 642.38 | 1019 | 12291 | 7970 | 45772 | 14327 | 251 | 20906 | 26009 | 29325 |
| 2005 | 673.88 | 1008 | 12253 | 9360 | 44836 | 13893 | 7199 | 23483 | 28057 | 29943 |
| 2006 | 720.97 | 1047 | 12386 | 9324 | 50399 | 14438 | 6750 | 21937 | 34358 | 31296 |
| 2007 | 788.58 | 1128 | 13347 | 11398 | 50479 | 16379 | 7821 | 237786 | 38136 | 32164 |
| 2008 | 782.2 | 1047.8 | 14032 | 12422 | 54350 | 16295 | 6678 | 26625 | 41454 | 35042 |

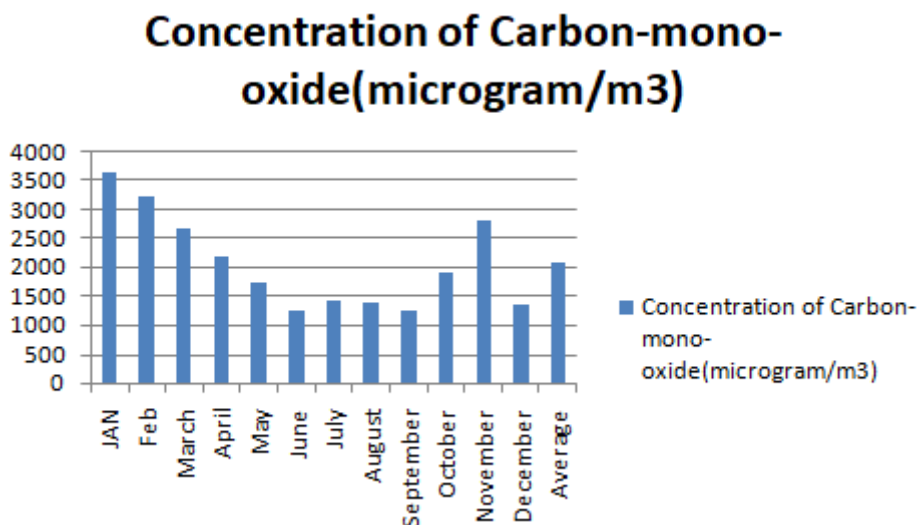
GRAPHICAL REPRESENTATION

The Air quality trends for different states of INDIA in the ten years has been depicted in the graph between year (X-axis) VS Concentration (Y-axis) in (micrograms/m3) as shown below as follows:



EMISSON OF CARBON-MONO-OXIDE ACROSS DIFFERENT MONTHS IN DELHI

The Air quality trends for DELHI in different months has been depicted in the graph between years (X-axis) VS Concentration (Y-axis) in (micrograms/m³) as shown below as follows:



ANALYSIS

From the above representation, we can infer that the minimum concentration of carbon-monoxide is found during the months of June and September.

CONCLUSION

The above trends indicate most of the metropolitan cities and states such as Uttar Pradesh are heavily polluted and the states such as Tamil Nadu, Jharkhand are less polluted.

However, major states in INDIA have not been able to anthologize with the National Ambient Air Quality Standards especially in case of particulate matter 10(PM-10). The major reason is the vehicular emissions and in order to curb this menace central government should come up with stringent applications of BHARAT SATGE EMMISION NORMS and also should look alternatives for diesel engines like amalgamation mainly consisting of Di Methyl Ether(DME) (Fleisch, McCarthy et al. 1995).

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