



Maharashtra Pollution Control Board

महाराष्ट्र प्रदूषण नियंत्रण मंडळ

Compilation of Air Quality Data Recorded in Maharashtra – 2011-12



The Energy and Resources Institute

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Prepared by



PREFACE

Maharashtra Pollution Control Board (MPCB) has established Ambient Air Quality Network in Maharashtra covering major cities to comply with the mandate of Air (Prevention & Control of Pollution) Act, 1981 and to disseminate status of air quality prevailing in the State of Maharashtra.

The Ambient air quality is monitored by the Board through manually operated stations at various locations in Maharashtra under National Ambient Air Quality Monitoring Program (NAMP) / State Ambient Air Quality Monitoring Program (SAMP) and Continuous Ambient Air Quality Monitoring Stations (CAAQMS) at Mumbai, Pune and Solapur. The Air Quality data is regularly hosted on MPCB's website.

This report compiles and presents illustrative statistical data of the ambient air quality in Maharashtra for the fiscal year 2011-12. I trust this report will help all stake holders to take necessary mitigation measures.

This report is prepared by The Energy and Resources Institute (TERI), Western Regional Centre (WRC), Mumbai and I appreciate the efforts of Dr. Anjali Parasnis, *Associate Director*, TERI and Shri. Prathamesh Chourey *Associate Fellow*, TERI in preparing this report for the Board. I also acknowledge the monitoring agencies for their efforts in the field for monitoring work carried out to generate the air quality data. The contribution of Shri V.M. Motghare, *Joint Director* and Shri S.C. Kollur, *Scientific Officer*, MPCB is also appreciated.


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Member Secretary

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Abbreviations

AAQM	Ambient Air Quality Monitoring
AAQMS	Ambient Air Quality Monitoring Stations
ALRI	Acute Lower Respiratory Infections
AMR	Amravati
Ar	Argon
AUR	Aurangabad
CAAQMS	Continuous Ambient Air Quality Monitoring Stations
CDP	Chandrapur
CH ₄	Methane
CIDCO	City and Industrial Development Corporation of Maharashtra Ltd
CO	Carbon Monoxide
CO ₂	Carbon-di-oxide
CPCB	Central Pollution Control Board
GoM	Government of Maharashtra
H ₂	Hydrogen
He	Helium
KOP	Kolhapur
Kr	Krypton
Max	Maximum
MIDC	Maharashtra Industrial Development Corporation
Min	Minimum
MPCB	Maharashtra Pollution Control Board
MVD	Motor Vehicle Department
N ₂	Nitrogen
NAAQM	National Ambient Air Quality Monitoring
NAMP	National Air Monitoring Program
Ne	Neon
NEERI	National Environmental Engineering Research Institute
NGP	Nagpur
NHK	Nashik
NOX	Oxides of Nitrogen

NVM	Navi Mumbai
O ₂	Oxygen
O ₃	Ozone
Pb	Lead
PM	Particulate Matter
PM ₁₀	Particulate Matter less than 10 microns
PM _{2.5}	Particulate Matter less than 2.5 microns
PUN	Pune
RO	Regional Office
RGD	Raigad
RSPM	Respirable Suspended Particulate Matter
SAMP	State Air Monitoring Program
SO ₂	Sulphur dioxide
SPM	Suspended Particulate Matter
TERI	The Energy and Resources Institute
TNA	Thane
TTC	Trans Thane Creek
USEPA	United States Environmental Protection Agency
VOCs	Volatile Organic Compounds
µg/m ³	Micrograms per cubic meter

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Executive Summary

As per Census of India 2011, the state of Maharashtra has the highest absolute urban population in India (more than 50 million) and as per World Bank the state contributes to more than 15% of the national industrial output. Along with population, other urban issues also play an important role and the impacts can be compounded due to industrialization, vehicular traffic, usage of petro products, construction activities and infrastructure development. Combustion of fossil fuels like coal, petrol, diesel and so on to meet the energy demands for electricity generation and vehicular movement are considered the major reason for air pollution. According to the Indian Petroleum and Natural Gas Statistics 2011-12, Maharashtra consumed more than 17 million tonnes of petroleum products, the highest among all the states in India. The state also accounts for the highest number of registered transport vehicles in the country. In this background monitoring and regulating “Air pollution” especially in a state like Maharashtra becomes one of the major concerns as well as a responsibility of the state.

Since the implementation of Air act in 1981, MPCB (Maharashtra Pollution Control Board) has been taking action oriented initiatives to monitor, regulate, mitigate and reduce the emissions arising from anthropogenic activities in the state. 3 AAQMS (Ambient Air Monitoring Stations) were installed under NAMP (National Air Monitoring Program) in the year 1990 at Kalbadevi, Parel and Bandra in Mumbai. Subsequently many more ambient air quality stations were installed under NAMP and SAMP (State Air Monitoring Program) across the state in various industrial and residential areas.

As on March 2012, there were 68 active AAQMS in Maharashtra under NAMP (59), SAMP (3) and Continuous AAQMS (CAAQMS) (6). Apart from these there are 3 more AAQMS under NAMP, which are regulated and monitored by NEERI (National Environmental Engineering Research Institute). SO₂ (Sulphur Dioxide), NO_x (Oxides of Nitrogen) and RSPM (Respirable Suspended Particulate Matter) are uniformly monitored across all the AAQMS. Other air pollutants like CO (Carbon Monoxide), ozone, benzene, toluene and xylene were monitored at 2 CAAQMS locations namely Bandra and Pune whereas CO and Ozone were monitored at Solapur CAAQMS.

Sulphur Dioxide

SO₂ concentrations were recorded well within the annual standards across all the AAQMS in Maharashtra. Amongst all the stations representing industrial areas, the AAQM monitoring at Nanded Industrial Area recorded the highest annual average SO₂ levels of 43.3µg/m³. Similarly, the AAQMS representing residential areas of Ulhasnagar and Badlapur recorded the highest annual average SO₂ levels of 43.3 and 41.0µg/m³ respectively. Presented below in Table No 1 are the top five areas where highest sulphur dioxide pollution levels were recorded in the state.

Table No 1: Top five AAQMS which recorded highest annual average SO₂ pollution (2011-12)

Region	RO	Monitoring Station	Annual Avg of SO2
Ulhasnagar	KYN	Powai Chowk	43.3
Nanded	AUR	Industrial Area CIDCO	42.8
Badlapur	KYN	Badlapur - BIWA House	41.0
Taloja	NVM	Taloja - MIDC Building	37.5
Ulhasnagar	KYN	Smt. CHM College Campus	36.9

Oxides of Nitrogen

Out of total of 69 AAQMS in the state, highest NO_x concentrations were observed in the Western region of Maharashtra (Table No 2). The annual average NO_x levels at Airoli (Navi Mumbai) were the highest with the value of 75.4µg/m³, followed by the monitoring at Ulhasnagar (74.1µg/m³) and Badlapur (67.9 µg/m³). In highly dense and busy areas of Sion- (65.7µg/m³) and Bandra (65.4 µg/m³), the monitoring was carried out on a continuous basis. While, Akola area in Amravati RO recorded least NO_x concentrations with the least annual average NO_x levels being recorded near LRT Commerce College in Akola (7.14µg/m³), the cleanest in terms of NO_x pollution in the state.

Table No 2: Top ten AAQMS which recorded highest annual average NO_x pollution (2011-12)

Region	RO	Monitoring Station	Annual Avg of NO _x
Navi Mumbai	NVM	Airoli	75.4
Ulhasnagar	KYN	Powai Chowk	74.1
Badlapur	KYN	Badlapur - BIWA House	67.9
Mumbai	MUM	Sion	65.7
Mumbai	MUM	Bandra	65.4
Ulhasnagar	KYN	Smt. CHM College Campus	64.1
Solapur	PUN	Solapur	63.4
Pune	PUN	Nal Stop	61.6
Pune	PUN	Karve Road - CAAQMS	57.5

Particulate Matter (PM)

High RSPM levels are a major concern of air pollution in the state of Maharashtra. Owing to activities like cement manufacturing, construction activities and the presence of quarry sites and power plants and so on high RSPM levels were recorded at all the AAQMS in Maharashtra. More than 80% (60 out of 69) AAQMS in Maharashtra exceeded the annual average RSPM standards (60 µg/m³).

AAQMS at Ghuggus town, in Chandrapur region, despite representing a residential area recorded highest annual average RSPM levels of 206.2µg/m³, which is more than 3times the standard value. Mining of coal and the location of cement manufacturing company and steel plant in and around the monitoring station may be factors contributing to the higher levels of pollution. The industrial areas of Chandrapur also recorded high annual average RSPM levels with AAQM at Rajura being 158.8µg/m³ and Tadali MIDC area 151µg/m³. The top ten AAQMS which recorded high levels of RSPM are tabulated in Table No 3.

Table No 3: Top ten AAQMS which recorded highest annual average RSPM pollution (2011-12)

Region	RO	Monitoring Station	Annual Avg of RSPM
Chandrapur	CDP	Ghuggus	206.2
Navi Mumbai	NVM	Airoli	180.8
Chandrapur	CDP	Rajura	158.8
Chandrapur	CDP	Tadali MIDC	151.0
Akola	AMR	Akola- College of Engg & Technology	150.1

Region	RO	Monitoring Station	Annual Avg of RSPM
Mumbai	MUM	Sion	149.8
Pune	PUN	Bhosari	148.0
Akola	AMR	MIDC Water Works	141.3
Latur	AUR	Ganj Golai - Sidhsheshwar Bank	140.5
Jalna	AUR	Jalna- Krishnadhnan seeds Ltd	140.1

Carbon Monoxide and Ozone

CO and ozone were monitored at a few locations. CAAQMS at Bandra and Pune recorded a total of 8735 and 8753 observations respectively, while the CAAQMS at Solapur recorded 366 readings. Given that both these pollutants are highly reactive and hence unstable, CPCB gives 8 hour and 1 hour standards for these pollutants.

At the Bandra CAAQMS more than 61% of the CO levels, exceeded the 8 hour standard of 2mg/m³ whereas 12.49% of the observations exceeded the hourly standards of 4mg/m³. This indicates an alarming situation for CO pollution at Bandra. Pune recorded lower levels of CO pollution with only about 3% of the observations exceeding the 8 hour standards while less than 0.5% observations exceeding the 1 hour standards. The maximum 1 hour CO concentration recorded on October 25, 2011 at Pune was 12.36mg/m³.

In terms of Ozone concentrations, all the readings recorded at Bandra CAAQMS, exceeded neither the 8 hour nor 1 hour standards. The maximum ozone concentration recorded at Bandra CAAQMS was 8.57µg/m³ on July 13, 2011. Out of the total observations for ozone concentrations at Pune CAAQMS, more than 8% of the observations violated the 8 hour standards. This indicates that ozone pollution near CAAQMS at Pune is higher as compared to the area near Bandra CAAQMS. The maximum ozone concentration of 230.17µg/m³ was recorded at Pune CAAQMS on March 12, 2012. The top five 1 hour observations for ozone pollution too were recorded in the month of March.

Benzene

Benzene pollution was recorded at 2 CAAQMS, Bandra and Pune. The annual average benzene concentrations were recorded to be 2.65 and 0.03µg/m³ respectively. The annual average standards for benzene have been set as 5µg/m³ by CPCB, indicating that the benzene pollution at both the locations was well below the permissible limits. However the highest 1 hour ozone concentrations recorded at Bandra and Pune were 164.38 and 2.41µg/m³ respectively.

Introduction

Urbanization is a process of relative growth in a country's urban population accompanied by a rapid increase in the economic, political, and cultural importance of cities relative to rural areas. While urbanization is characteristic of nearly all developing countries, there are significant regional variations in the levels of urbanization. Transformation of villages to towns and to cities, and then cities into metropolitan region, is an ongoing process and is highly resource intensive.

Urbanization, in India is on rise. It is evident from the fact that, for the first time since independence, the absolute increase in urban population has been more than that in rural areas in the last decade. The level of urbanization in India has also increased significantly from 27.81% in 2001 to 31.16% in 2011¹. On one hand, the escalating demands and limited supply for resources like water and energy are creating severe resource crunch and on the other hand, anthropogenic activities induce stress on the ecosystem due to release of pollutants which leads to undesirable pollution in the environment. Pollution is defined as the introduction of contaminants into the natural environment that causes adverse change to the otherwise normal constituents of natural resources like water, land and air.

The Earth's atmosphere is a layer of gases surrounding the planet that is retained by its gravitational power. This mixture of gases which envelopes the earth is commonly known as Air. The composition of pure air consists majorly of Nitrogen and Oxygen. Other gases like Argon, Carbon-di-oxide, Methane and so on are present in trace amounts. A representative pie chart depicting the composition of natural air, in earth's atmosphere is presented in Figure No 1.

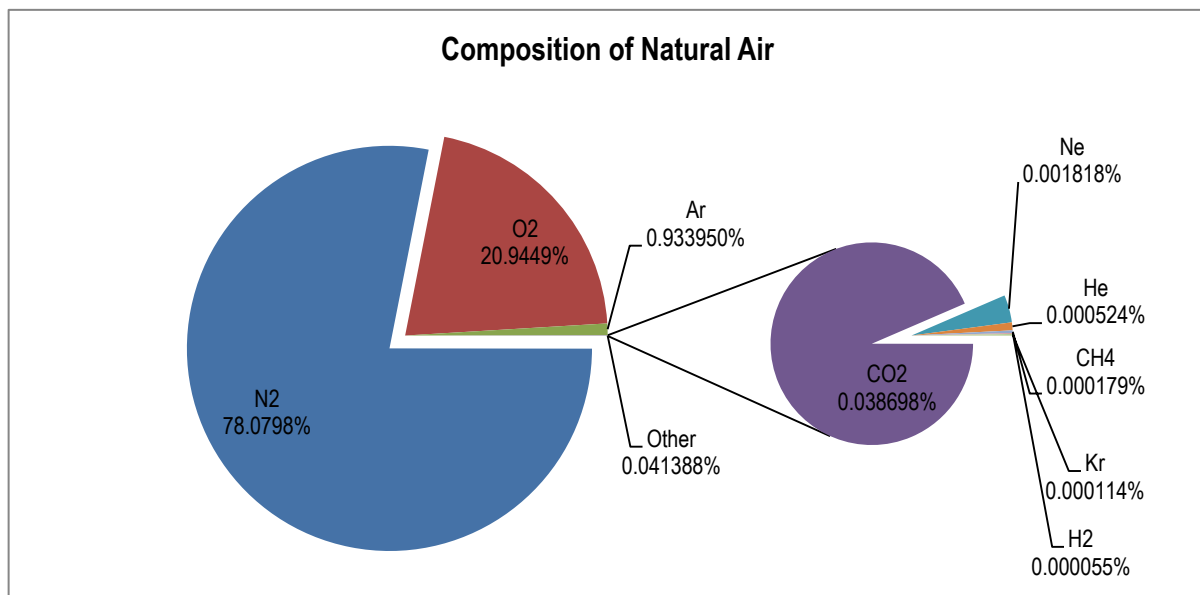


Figure No 1: Composition of natural air

Data Source: Hand book of Air Pollution, PHS Publication AP-44 (PB 190-247), 1968 [40]

Note: Ar: Argon; CH₄: Methane, CO₂: Carbon-di-oxide; H₂: Hydrogen; He: Helium; Kr: Krypton; N₂: Nitrogen; Ne: Neon; O₂: Oxygen.

¹ http://censusindia.gov.in/2011-prov-results/paper2/data_files/india/Rural_Urban_2011.pdf

Air Pollution

A number of undesirable elements have been added to the natural ambient air's composition especially due to anthropogenic activities involving combustion of fossil fuels. Power plants, industries, automobiles, construction activities and so on emit tonnes of air pollutants every day, thereby deteriorating the air quality and exposing citizens to great health risks. An air pollutant has been defined as any solid, liquid or gaseous substance (including noise) present in the atmosphere in such concentration as may be or tend to be injurious to human beings or other living creatures or plants or property or environment. This change in the composition of pure air is termed as "Air Pollution". The source of air pollutants could be both natural as well as anthropogenic. The 6 major air pollutants identified by USEPA (United States Environmental Protection Agency), their anthropogenic source and their effects on human health, are presented below in Table No 4.

Table No 4: Major air pollutants, their sources and their effects on humans

Pollutants	Sources	Effects
Nitrogen dioxide (NO _x)	Combustion processes (heating, power generation, and vehicles)	<ul style="list-style-type: none"> • Bronchitis in asthmatic children. • Reduced lung function
Particulate Matter (PM _{2.5} , PM ₁₀)	Vehicles, industrial sources, domestic fuel burning, road dust re-suspension,	<ul style="list-style-type: none"> • Cardiovascular and respiratory diseases, • Lung cancer, • ALRI (Acute Lower Respiratory Infections)
Carbon monoxide (CO)	Incomplete fuel combustion (as in motor vehicles)	<ul style="list-style-type: none"> • Reduces the oxygen carrying capacity of blood, • Causes headaches, nausea, and dizziness • Can lead to death at high levels
Sulphur dioxide (SO ₂)	Burning of sulphur-containing fuels for heating, power & vehicles.	<ul style="list-style-type: none"> • Affects respiratory system and lung function. Coughing, mucus secretion, asthma and chronic bronchitis. • Causes acid rain.
Lead (Pb)	Petrol and industry (such as smelting, and paint works).	<ul style="list-style-type: none"> • Affects brain development of children, • At very high doses leads to poisoning, • May lead to brain and organ damage.
Ozone (O ₃) Tropospheric	Formed by the reaction of NO _x and (VOCs) in sunlight	<ul style="list-style-type: none"> • Breathing problems, asthma, reduce lung function.

Challenges and Initiatives in India

As India is developing, the problems associated with pollution are also increasing at a rapid rate. Rapidly growing Indian cities are suffering from some of the worst air quality problems in the world. The major sources responsible for air pollution in India are fuel adulteration, emissions from power plants, transport sector, industrial emissions, combustion of fuel wood & biomass, construction activities, and traffic congestion².

Since the 1970s an environmental network of environmental legislation in India has taken serious initiatives to tackle the issue of air pollution. To counter the problems associated with air pollution Government of India enacted the Air (prevention and control pollution) Act 1981. The act prescribes to combat air pollution by prohibiting the use of polluting fuels and substances as well as appliances that give rise to air pollution. Under this Act, the central government is empowered to take measures necessary to protect and improve the quality of the environment by setting standards for emissions and discharges; regulating the location of industries; management of hazardous wastes, and protection of public health and welfare.

Central Pollution Control Board

The CPCB (Central Pollution Control Board), statutory organisation, was constituted in September, 1974 under the Water (Prevention and Control of Pollution) Act, 1974. Further, CPCB was entrusted with the powers and functions under the Air (Prevention and Control of Pollution) Act, 1981. The principal function of the CPCB, under the Air (Prevention and Control of Pollution) Act, 1981, is to improve the quality of air and to prevent, control or abate air pollution in the country.

CPCB initiated NAAQM (National Ambient Air Quality Monitoring) programme in the year 1984. Subsequently, for expanding the network to have representation of various regions in the country, various stations were established nationwide under this programme. The program was subsequently renamed as NAMP (National Air Quality Monitoring Programme). In the year 2010-11 CPCB was executing NAMP for generating air quality database at 456 air quality motoring stations throughout the nation covering 190 cities in 26 States and 4 union territories³. Further, CPCB under the Air (Prevention and Control) Act has set the NAAQS (National Ambient Air Quality Standards) with the following objectives:

- To indicate the levels of air quality necessary with an adequate margin of safety to protect the public health, vegetation and property
- To assist in establishing priorities for abatement and control of pollutant level
- To provide uniform yardstick for assessing air quality at national level
- To indicate the need and extent of monitoring programme

The revised National Ambient Air Quality Standards were notified on 18 November 2009. A copy of the Gazette is enclosed as **Appendix A**.

² "Urban Air Pollution, Catching gasoline and diesel adulteration. The World Bank. 2002

³ CPCB, 2011-12 [National Ambient Air Quality Status & Trends In India-2010](#), Chapter 1 Introduction, pg 3

Maharashtra Pollution Control Board

The Maharashtra State government in 1981 adopted the Water (Prevention and Control of Pollution) Act 1974 and under this MPCB (Maharashtra Pollution Control Board) was established in the year 1981.

MPCB has established 12 regional offices across the state to check and regulate the pollution levels with necessary control measures. MPCB implements a range of environmental legislation in the state and functions under the administrative control of Environment Department, Government of Maharashtra.

The main functions of MPCB are:

- To plan comprehensive program for the prevention, control or abatement of pollution and secure executions thereof,
- To collect and disseminate information relating to pollution and the prevention, control or abatement thereof,
- To inspect sewage or trade effluent treatment and disposal facilities, and air pollution control systems and to review plans, specification or any other data relating to the treatment plants, disposal systems and air pollution control systems in connection with the consent granted,
- Supporting and encouraging the developments in the fields of pollution control, waste recycle reuse, eco-friendly practices etc.
- To educate and guide the entrepreneurs in improving environment by suggesting appropriate pollution control technologies and techniques
- To create public awareness about clean and healthy environment and attending the public complaints regarding pollution.

The Air (Prevention & Control of Pollution) Act 1981 was adopted by the state of Maharashtra in 1983 and the MPCB is functioning as the state board under section 5 of this Act. Following this MPCB has taken many initiatives to control, prevent and monitor air quality in the state of Maharashtra.

Being a highly industrialised, populated and urbanized state, Maharashtra has numerous air pollution sources, which have deteriorated air quality of many cities. The state has a wide range of major industries like power plants, pharmaceuticals, petroleum, and manufacturing of fertilizers. All of these industries are involved in polluting activities. Vehicular growth, construction activities, quarry sites and similar activities have further augmented the deterioration of the air quality.

Hence, to keep a constant vigilance on the status of the air quality in the industrially influenced areas like Dombivali, Ambarnath, Chandrapur and the exposure to the population in residential areas, MPCB has installed air quality monitoring stations in Maharashtra. The following section presents the highlights of the monitoring and the air quality recorded in the year 2011-12.

Air Quality Monitoring in Maharashtra

Ambient air quality monitoring network is designed to get spatial and temporal variation of ambient air concentrations addressing a wide range of pollutants that are considered relevant for evolving a strategic management plan. Monitoring locations are selected to represent different land use categories like kerbside, residential, industrial, commercial etc. were selected so as to capture air quality levels under different activity profiles. To have a continuous vigilance of the air quality in the different parts of the state MPCB has installed various AAQMS (Ambient Air Quality Monitoring Stations) in various regions of the state. The following section provides an overview of the status of AAQM (Ambient Air Quality Monitoring) in the year 2011-12.

Monitoring Network

AAQMS are added periodically to expand the network of monitoring stations. However due to operating challenges like maintenance issues, shortage of manpower and change of location, some monitoring stations are closed temporarily and the hence data is unavailable for that particular station or may not be available for that spell of time. As on March 2012, there were 68 AAQMS in Maharashtra under CAAQMS (6), NAMP (59) and SAMP (3). Apart from these there are 3 more AAQMS under NAMP, which are regulated and monitored by NEERI (National Environmental Engineering Research Institute). As per data availability each year the corresponding tally of AAQMS is presented below in Figure No 2.

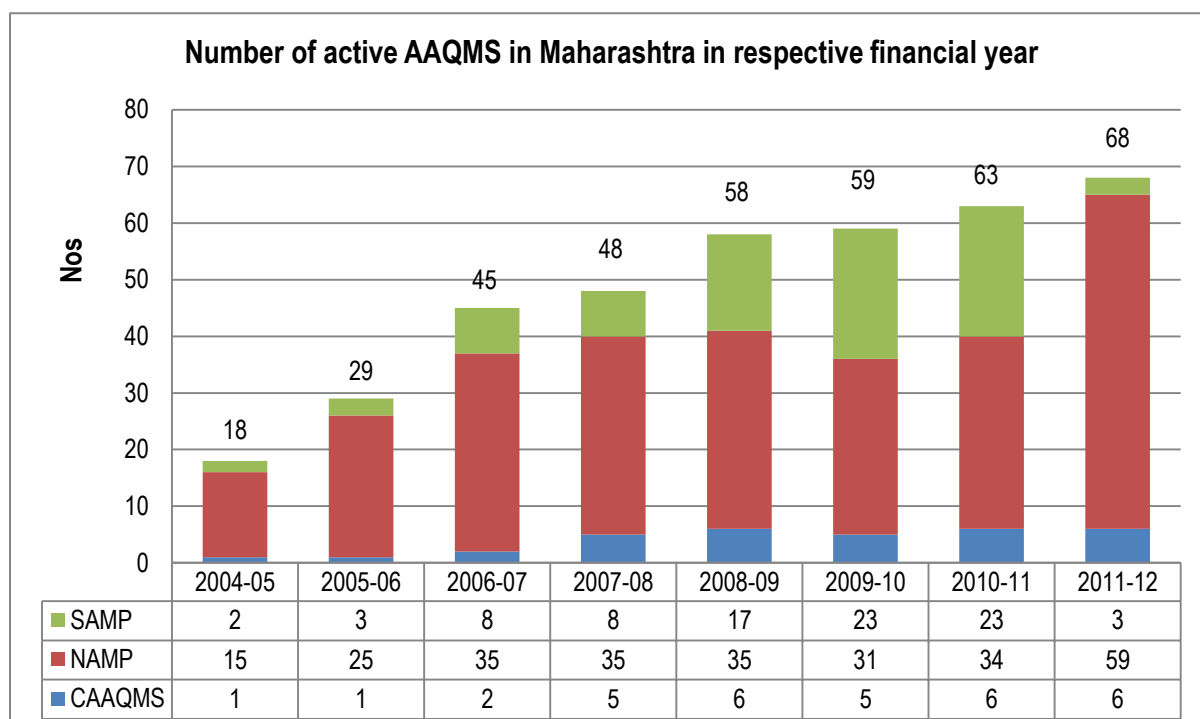


Figure No 2: Number of active AAQMS in Maharashtra in respective financial year

Data Source: MPCB, 2013

**Note: Data for Worli AAQMS monitored by NEERI has been considered for the analysis as per data available with MPCB.*

Given that Maharashtra has very prominent industrial zones and is one of the highly populated states in the country air quality monitoring becomes essential at these locations. However, owing to the population growth and expansion of the cities the residential areas have now expanded to such an extent that they are now located in very close vicinity of the industrial belts. Some examples of the same are the residential areas in Navi Mumbai, Dombivali, Ambernath, where the residential zones lie very close to the industrial areas. Hence, in a given region there is a mix of various types of monitoring stations representing different type of areas. MPCB-RO (Regional Office) wise tally of AAQMS operating in the year 2011-12 is presented in Table No 5. The detailed list of the active stations is presented in Annex-I of this report. The jurisdiction boundaries and the tally of the AAQMS in each RO are presented in Figure No 3.

Table No 5: MPCB RO wise tally of active AAQMS (2011-12)

Regional Office	Commercial	Industrial	Residential	Rural & other areas	Sensitive	Total
Amravati	1	2	2	1	-	6
Aurangabad	1	3	6	1	-	11
Chandrapur	-	3	3	-	-	6
Kalyan	2	-	-	3	1	6
Kolhapur	-	2	4	2	-	8
Mumbai*	-	-	2	-	-	2
Nagpur	-	1	2	1	-	4
Nashik	-	2	4	-	-	6
Navi Mumbai	-	3	3	1	-	7
Pune	-	1	6	1	-	8
Raigad	-	-	1	-	-	1
Thane	-	1	1	1	-	3
Total	4	18	35	11	1	68

Data Source: MPCB, 2013

**Note: NEERI Worli AAQMS is under Mumbai but not considered in this tally*

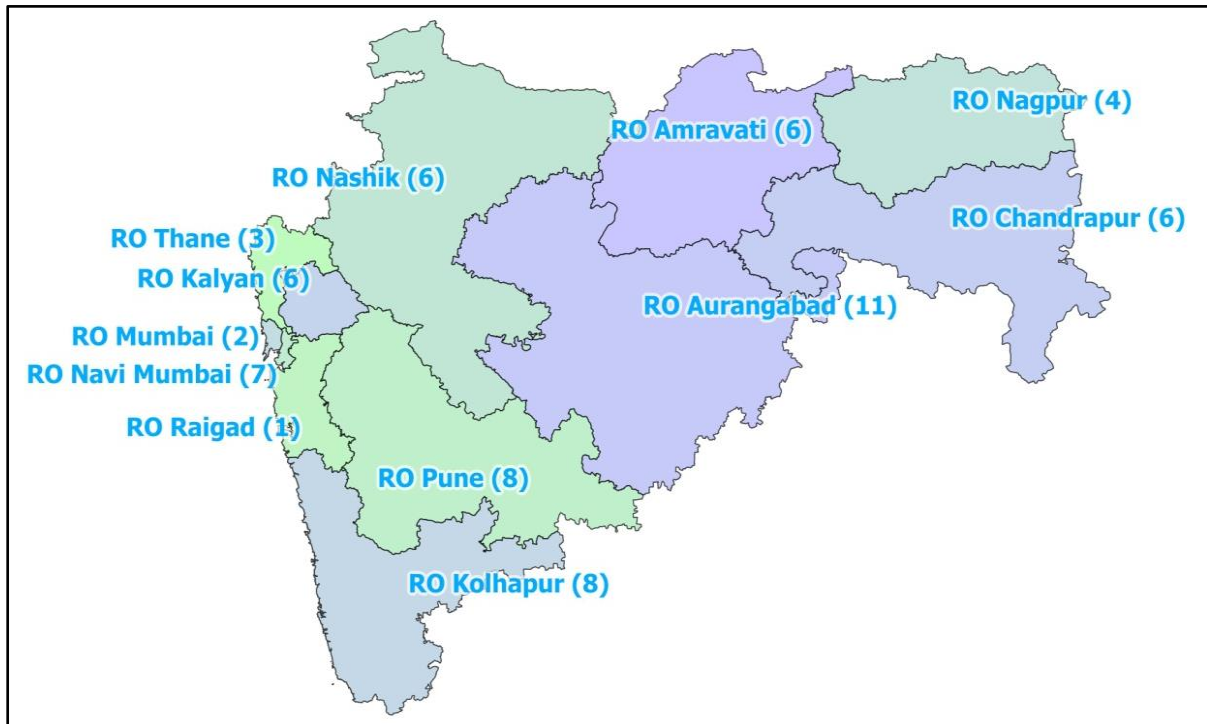


Figure No 3: Boundaries and tally of AAQMS in each RO of MPCB (2011-12)

Pollutants Monitored

SO₂ (Sulphur Dioxide), NO_x (Nitrogen Oxides) and RSPM (Respirable Suspended Particulate Matter) are regularly and consistently monitored across all the monitoring sites in Maharashtra under NAMP, SAMP and also at the CAAQMS. SPM (Suspended Particulate Matter) are bigger than coarse particles. These settle down fast and do not reach the respiratory tract and therefore have less adverse effect on health⁴. As a result the standards for SPM have not been set as per revised NAAQS (2009). Although some monitoring stations do record the concentrations of SPM the same has not been considered for the statistical compilation.

Air Quality Monitoring Data

MPCB published the data recorded by all the monitoring sites in Maharashtra on its website. It also presents an interactive way to select the time series data for a particular monitoring station. The data sets recorded at the monitoring station for the year 2011-12 have been compiled in this report. A pollutant wise overview for the air quality recorded at the areas representing residential, industrial, commercial, rural & other areas and sensitive monitoring is presented in the following section.

Monitoring station wise annual trend for the recent 5 years and monthly trend for the year 2011-12 are presented in Annex – II.

⁴ CPCB 2012, [National Ambient Air Quality Status & Trends In India-2010](#), Chapter 6, Pg 83

Status of Air Quality

Sulphur dioxide

Sulphur dioxide (SO₂) belongs to a group of highly reactive gases known as “oxides of sulphur”. It is a colourless gas and smells like burnt matches. Sulphur compounds are responsible for the major damage to materials and are generally known to accelerate metal corrosion by forming sulphuric acid. The largest sources of SO₂ emissions are from fossil fuel combustion at power plants and other industrial facilities. Smaller sources of SO₂ emissions include industrial processes such as extracting metal from ore, and combustion of sulphur containing fuels (diesel) by vehicles. The skeletal structure sources and impacts on humans is presented in Figure No 4.

SO₂ is linked with a number of adverse effects on the respiratory system. SO₂ is known to increase the airway resistance, and lung disease. Sulphur oxide in combination with particulate and moisture is a potentially serious health hazard and results in increased mortality. Aerosols of sulphuric acid and other sulphates have a share of 5-20% in total suspended particulate in urban air and are responsible for the reduction in visibility.

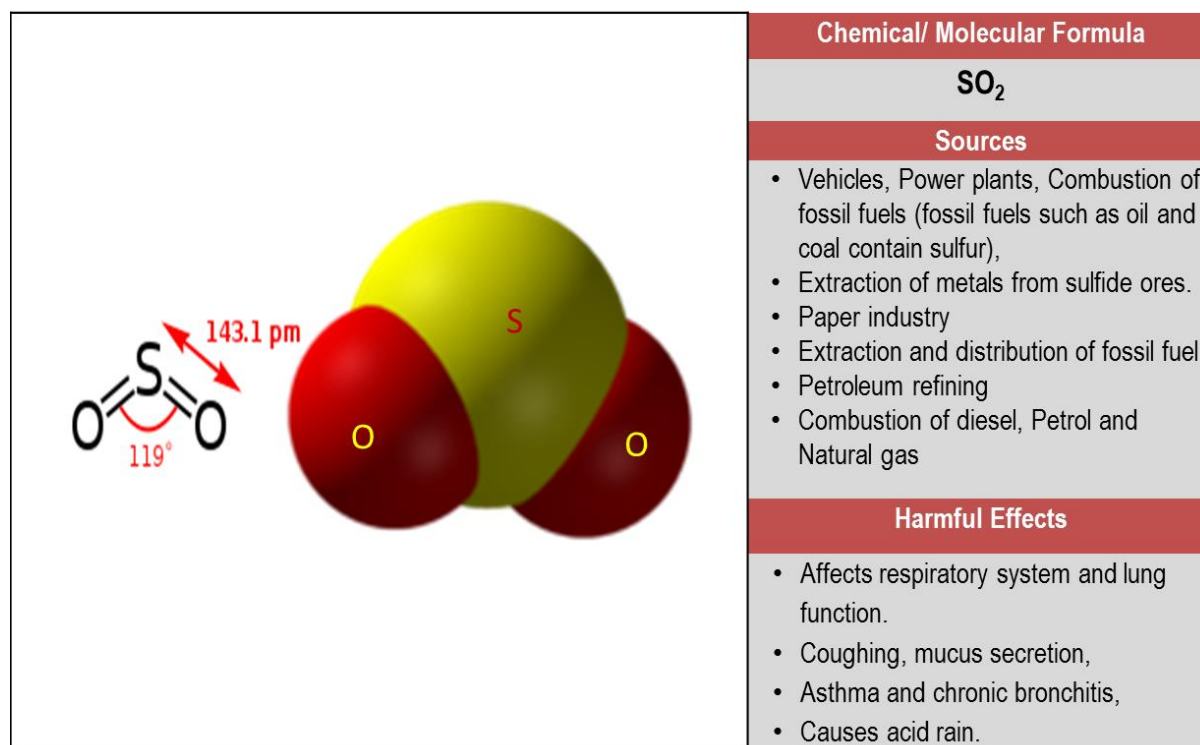


Figure No 4: Molecular formula, sources and harmful impacts of Sulphur dioxide

Data Source: [IB Chemistry](#)

Status of SO₂

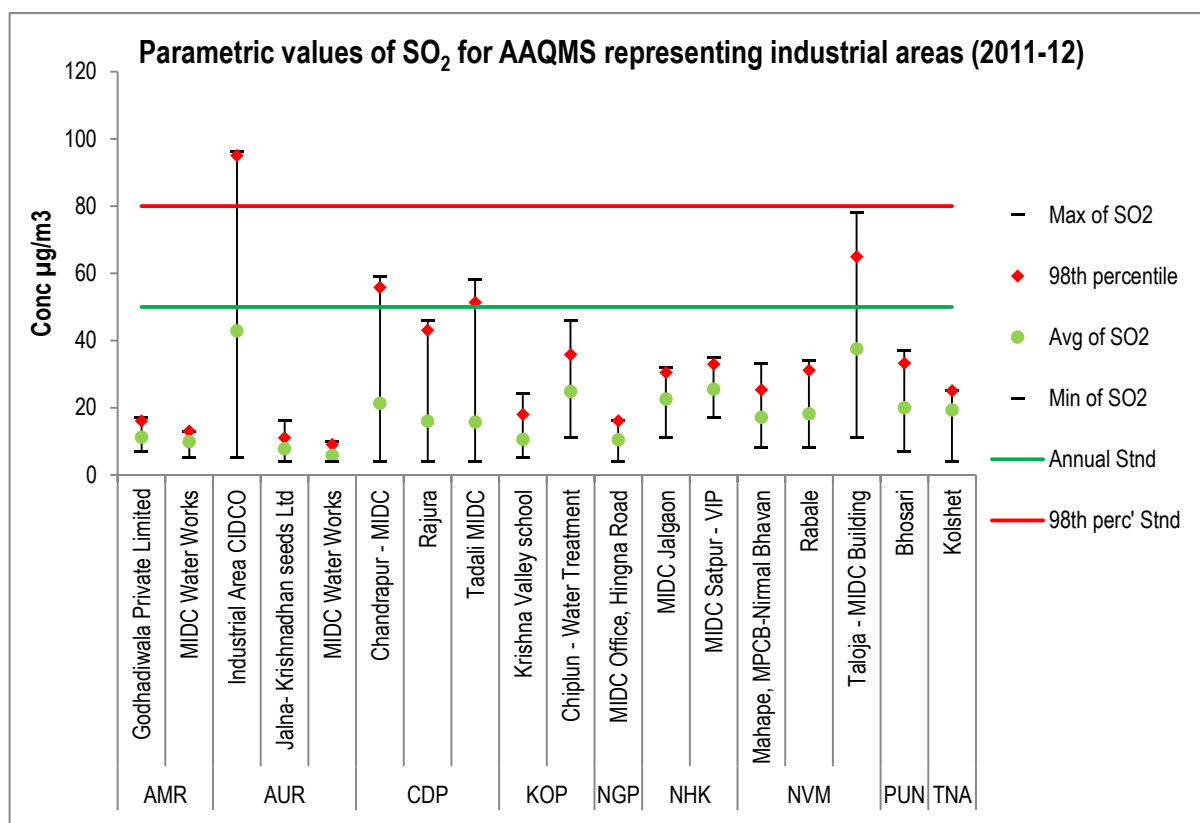


Figure No 5: Parametric values of SO₂ for AAQMS representing industrial areas (2011-12)

Data Source: MPCB, 2013

The SO₂ monitoring at AAQMS across Maharashtra revealed that SO₂ concentrations across all industrial areas were well below the annual standards set by CPCB (50µg/m³). The highest annual average SO₂ were recorded at the industrial area at Aurangabad followed by AAQMS at Bhosari (RO- Pune).

As seen in Figure No 5, the maximum SO₂ concentration recorded at industrial area of CIDCO (City and Industrial Development Corporation of Maharashtra Ltd) in Aurangabad was 96µg/m³. Also the 98th percentile reading of SO₂ concentration was at 95µg/m³ indicating that although the annual concentration may not be exceeding the annual standards there are certain days when the SO₂ concentration did exceed the 24 hours standards.

The MIDC (Maharashtra Industrial Development Corporation) at Aurangabad and Amravati were the least polluted industrial areas in terms of SO₂ concentrations in the year 2011-12, since the maximum and the average were well below the standards.

Table No 6: Data for SO₂ recorded at AAQMS representing industrial areas (2011-12)

RO	Station	Max of SO ₂	98th percentile	Avg of SO ₂	Min of SO ₂
	<i>CPCB Standards</i>	<i>80</i>	<i>80</i>	<i>50</i>	<i>80</i>
AMR	Godhadiwala Private Limited	17.0	16.0	11.2	7.0
	MIDC Water Works	13.0	13.0	9.9	5.0
AUR	Industrial Area CIDCO	96.0	95.0	42.8	5.0
	Jalna- Krishnadhan seeds Ltd	16.0	11.0	7.7	4.0
	MIDC Water Works	10.0	9.0	5.8	4.0
CDP	Chandrapur - MIDC	59.0	55.7	21.3	4.0
	Rajura	46.0	43.0	15.9	4.0
	Tadali MIDC	58.0	51.3	15.6	4.0
KOP	Krishna Valley school	24.0	17.9	10.5	5.0
	Chiplun - Water Treatment	46.0	35.8	24.8	11.0
NGP	MIDC Office, Hingna Road	16.0	16.0	10.4	4.0
NHK	MIDC Jalgaon	32.0	30.4	22.5	11.0
	MIDC Satpur - VIP	35.0	32.9	25.4	17.0
NVM	Mahape, MPCB-Nirmal Bhavan	33.0	25.3	17.1	8.0
	Rabale	34.0	31.1	18.1	8.0
	Taloja - MIDC Building	78.0	64.9	37.5	11.0
PUN	Bhosari	37.0	33.2	19.9	7.0
TNA	Kolshet	25.0	25.0	19.3	4.0

Data Source: MPCB, 2013

Units: µg/m³

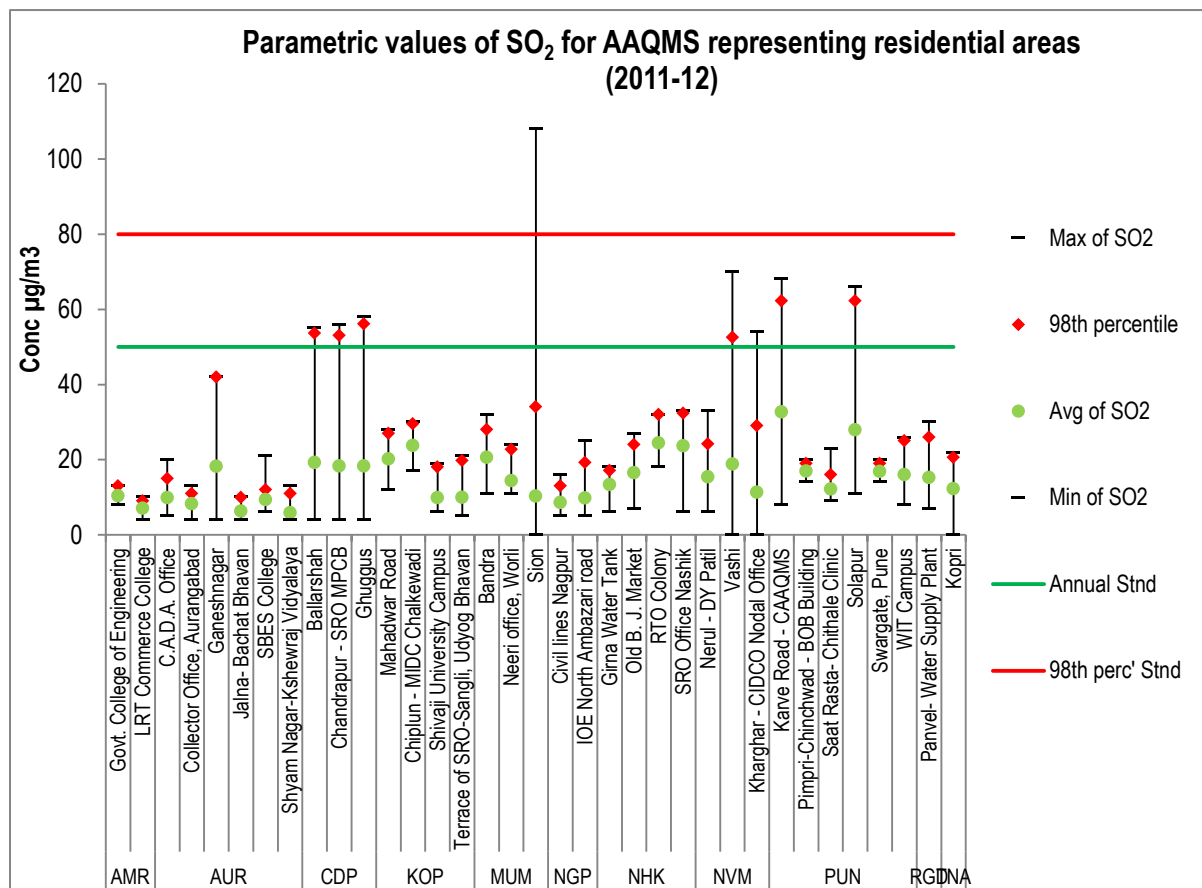


Figure No 6: Parametric values of SO₂ for AAQMS representing residential areas (2011-12)

Data Source: MPCB, 2013

As seen in Figure No 6, the SO₂ concentrations at the residential areas in Maharashtra were well within the permissible standards.

The monitoring station Sion recorded the maximum SO₂ concentration of 108.0µg/m³. However upon considering the 98th percentile reading for the same AAQMS one may note that the SO₂ concentration was 34µg/m³ which was way below the 24 hours standards indicating that the maximum reading recorded is an outlier.

The residential areas of Aurangabad, Amravati and Nagpur were among the cleanest in terms of SO₂ pollution; whereas the residential area in Pune and Nashik recorded annual average below the annual standards there has more SO₂ pollution as compared to other residential areas in the state.

On certain days in Vashi (Navi Mumbai), Sion (Mumbai) and Karve road (Pune) the minimum value of SO₂ concentration was below detection limit.

Table No 7: Data for SO₂ recorded at AAQMS representing residential areas (2011-12)

RO	Station	Max of SO ₂	98th percentile	Avg of SO ₂	Min of SO ₂
	<i>CPCB Standards</i>	<i>80</i>	<i>80</i>	<i>50</i>	<i>80</i>
AMR	Govt. College of Engineering	13.0	13.0	10.4	8.0
	LRT Commerce College	10.0	9.0	7.0	4.0
AUR	C.A.D.A. Office	20.0	15.0	9.9	5.0
	Collector Office, Aurangabad	13.0	11.0	8.2	4.0
	Ganeshnagar	42.0	42.0	18.2	4.0
	Jalna- Bachat Bhavan	10.0	9.9	6.3	4.0
	SBES College	21.0	12.0	9.3	6.0
CDP	Shyam Nagar-Kshewraj Vidyalaya	13.0	11.0	5.8	4.0
	Ballarshah	55.0	53.7	19.2	4.0
	Chandrapur - SRO MPCB	58.0	56.1	18.3	4.0
	Ghuggus	56.0	53.0	18.3	4.0
KOP	Mahadwar Road	28.0	27.0	20.1	12.0
	Chiplun - MIDC Chalkewadi	30.0	29.5	23.8	17.0
	Shivaji University Campus	19.0	18.0	9.8	6.0
	Terrace of SRO-Sangli, Udyog Bhavan	21.0	19.8	10.0	5.0
MUM	Bandra	32.0	28.0	20.6	11.0
	Neeri office, Worli	24.0	22.7	14.4	11.0
	Sion	108.0	34.0	10.3	0.0
NGP	Civil lines Nagpur	16.0	13.0	8.6	5.0
	IOE North Ambazari road	25.0	19.2	9.8	5.0
NHK	Girna Water Tank	18.0	17.1	13.3	6.0
	Old B. J. Market	27.0	24.0	16.5	7.0
	RTO Colony	32.0	32.0	24.4	18.0
	SRO Office Nashik	33.0	32.4	23.7	6.0
	Nerul - DY Patil	33.0	24.2	15.4	6.0
NVM	Vashi	70.0	52.5	18.8	0.0
	Kharghar - CIDCO Nodal Office	54.0	29.0	11.3	0.0
	Karve Road - CAAQMS	68.0	62.2	32.7	8.0
PUN	Pimpri-Chinchwad - BOB Building	20.0	19.0	16.9	14.0
	Saat Rasta- Chithale Clinic	23.0	16.0	12.2	9.0
	Solapur	66.0	62.2	27.9	11.0
	Swargate, Pune	20.0	19.0	16.8	14.0
	WIT Campus	26.0	25.0	16.0	8.0
RGD	Panvel- Water Supply Plant	30.0	26.0	15.2	7.0
TNA	Kopri	22.0	20.6	12.2	0.0

Data Source: MPCB, 2013

Units: µg/m³

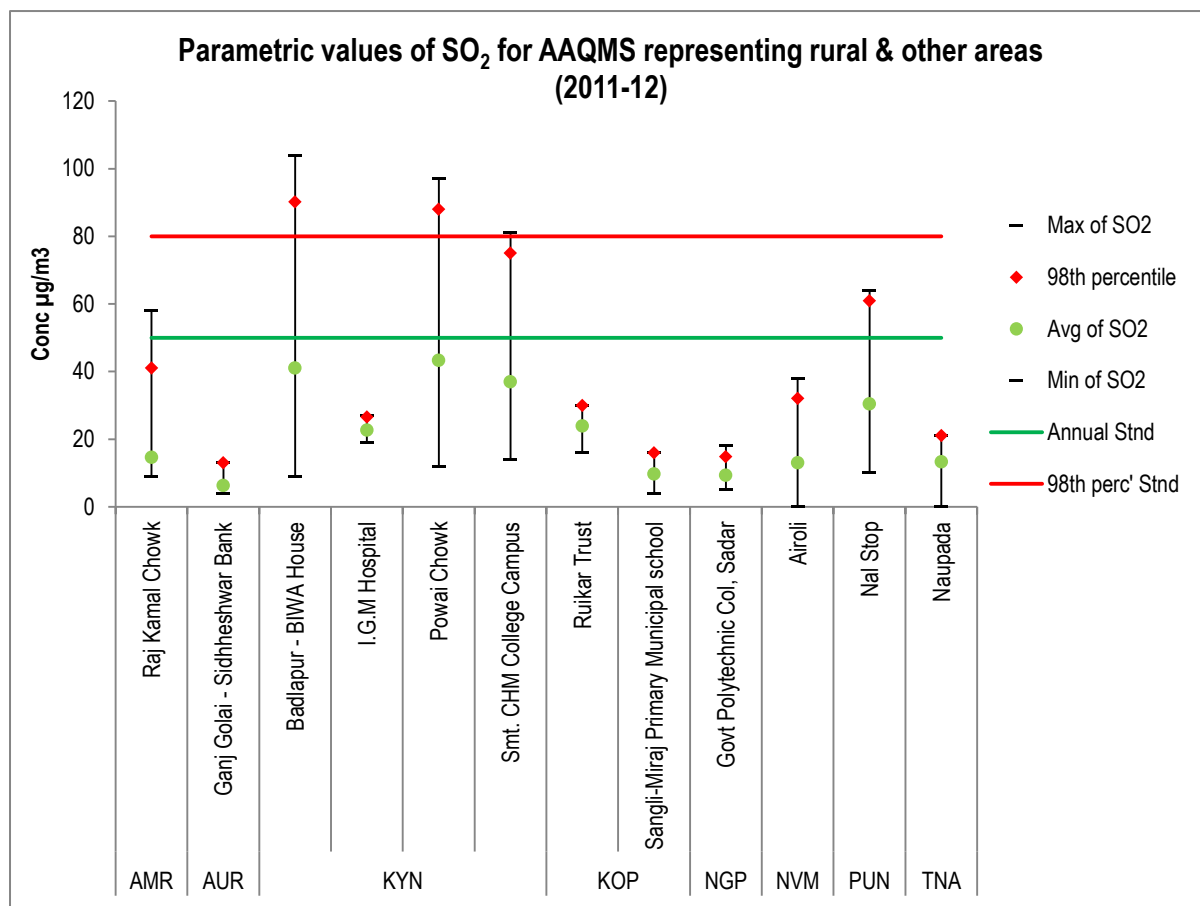


Figure No 7: Parametric values of SO₂ for AAQMS representing rural & other areas (2011-12)

Data Source: MPCB, 2013

*Note: IGM Hospital is categorized as a sensitive type of monitoring zone by MPCB

The areas representing mixed and other areas in Maharashtra also recorded SO₂ concentrations well within the prescribed standards.

However, as seen in Figure No 7 three monitoring stations in the Kalyan region (Bhiwandi, Badlapur and Ulhasnagar) recorded annual average SO₂ concentrations very close to the set standards. On certain days, the maximum as well as the 98th percentile reading recorded at the AAQMS at Badlapur and Bhiwandi exceeded the daily standards (80µg/m³). This indicated that these areas need further investigation.

Amravati, Aurangabad, Kolhapur and Nagpur were amongst the better performing AAQMS in terms of SO₂ concentrations.

Table No 8: Data for SO₂ recorded at AAQMS representing rural & other types of areas (2011-12)

RO	Station	Max of SO ₂	98 th percentile	Avg of SO ₂	Min of SO ₂
	<i>CPCB Standards</i>	<i>80</i>	<i>80</i>	<i>50</i>	<i>80</i>
AMR	Raj Kamal Chowk	58.0	41.0	14.6	9.0
AUR	Ganj Golai - Sidhleshwar Bank	13.0	13.0	6.2	4.0
KYN	Badlapur - BIWA House	104.0	90.1	41.0	9.0
	I.G.M Hospital	27.0	26.5	22.6	19.0
	Powai Chowk	97.0	88.0	43.3	12.0
	Smt. CHM College Campus	81.0	75.0	36.9	14.0
KOP	Ruikar Trust	30.0	29.9	23.9	16.0
	Sangli-Miraj Primary Municipal school	16.0	15.9	9.7	4.0
NGP	Govt Polytechnic Col, Sadar	18.0	14.8	9.3	5.0
NVM	Airoli	38.0	32.0	13.0	0.0
PUN	Nal Stop	64.0	60.9	30.4	10.0
TNA	Naupada	21.0	21.0	13.3	0.0

Data Source: MPCB, 2013

Units: µg/m³

*Note: IGM Hospital is categorized as a sensitive type of monitoring zone by MPCB

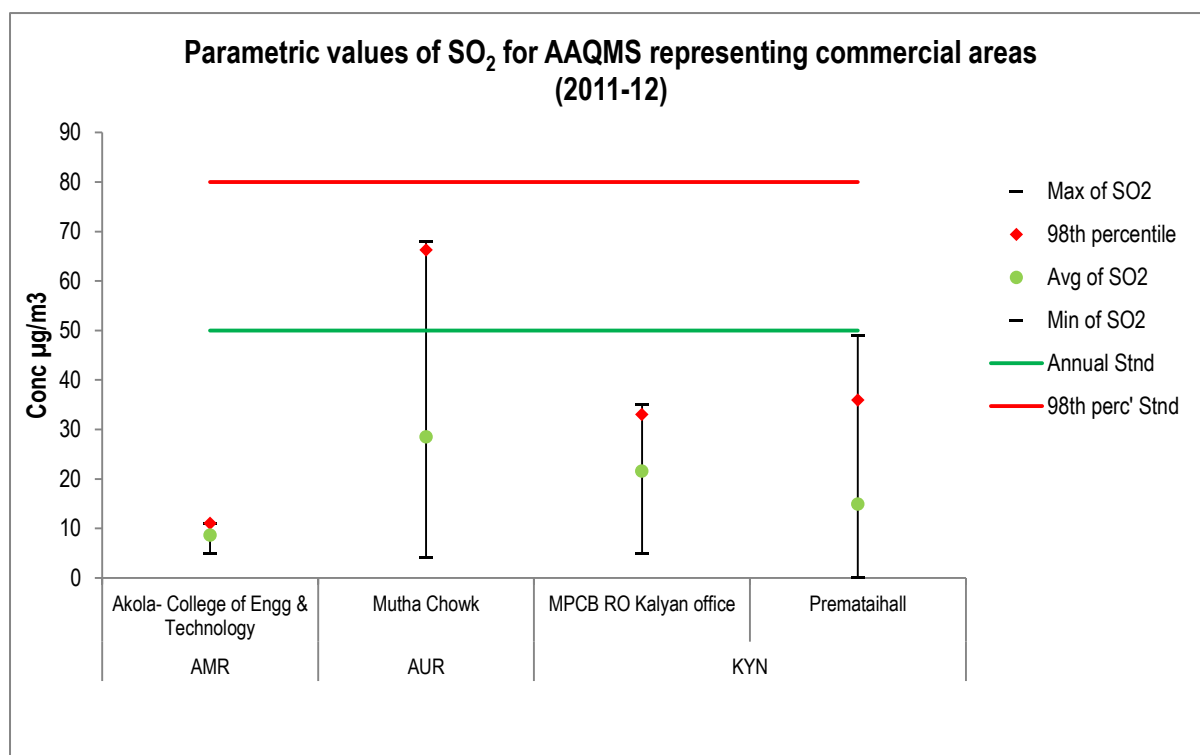


Figure No 8: Parametric values of SO₂ for AAQMS representing commercial areas (2011-12)

Data Source: MPCB, 2013

Commercial areas in Maharashtra were amongst the cleanest in terms of SO₂ pollution. All the stations recorded SO₂ concentrations less than half of the annual standards. The maximum SO₂ concentration of 68µg/m³ was recorded at Mutha Chowk in Aurangabad. Amravati region recorded the best annual trend for SO₂ concentrations with all the readings less than 11µg/m³.

Table No 9: Data for SO₂ recorded at AAQMS representing commercial areas (2011-12)

RO	Station	Max of SO ₂	98th percentile	Avg of SO ₂	Min of SO ₂
<i>CPCB Standards</i>		<i>80</i>	<i>80</i>	<i>50</i>	<i>80</i>
AMR	Akola- College of Engg & Technology	11.0	11.0	8.6	5.0
AUR	Mutha Chowk	68.0	66.2	28.5	4.0
KYN	MPCB RO Kalyan office	35.0	33.0	21.5	5.0
	Prematai hall	49.0	35.9	14.9	0.0

Data Source: MPCB, 2013

Units: µg/m³

Oxides of Nitrogen

The oxides of nitrogen, NO (Nitric Oxide) and NO₂ (nitrogen dioxide) are significant air pollutants. Neither NO nor NO₂ causes direct damage to materials; however, NO₂ reacts with atmospheric moisture to form nitric acid, which causes considerable corrosion of metal surfaces. NO₂ acts as an acute irritant and is more injurious than NO. The skeletal structure, their significant sources and impacts are presented below in Figure No 9.

In the presence of sunlight the oxides of nitrogen react with the unburned hydrocarbons to form photochemical smog which causes damage to plants and is also detrimental to human health. NO₂ is linked with a number of adverse effects on the respiratory system. Further it is also known to contribute to the formation of ground-level ozone and fine particle pollution.

Oxides of nitrogen are produced from the reaction of nitrogen and oxygen gases in the air during combustion, especially at high temperatures. In areas of high motor vehicle traffic, such as in large cities, the amount of nitrogen oxides emitted into the atmosphere as air pollution can be significant.

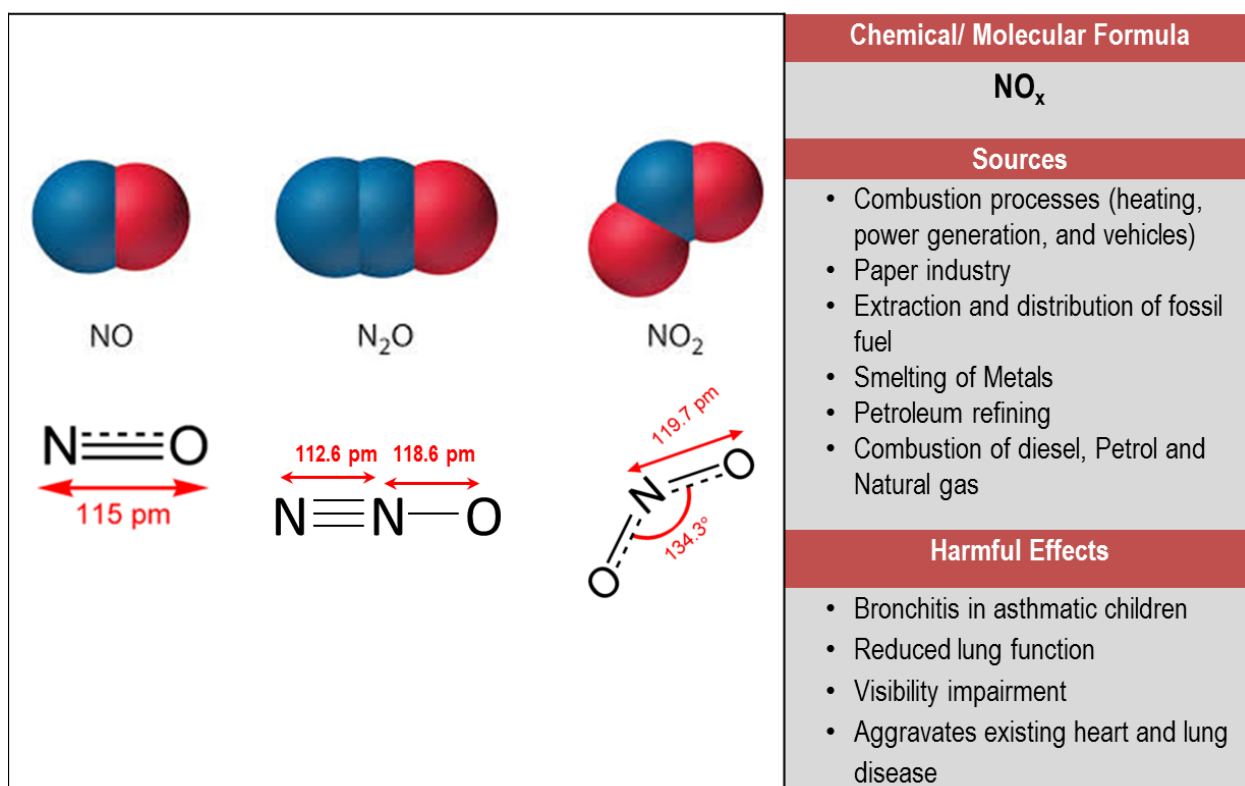


Figure No 9: Molecular formula, sources and harmful impacts of oxides of nitrogen

Data Source: [UC Davis](#)

Status of NO_x

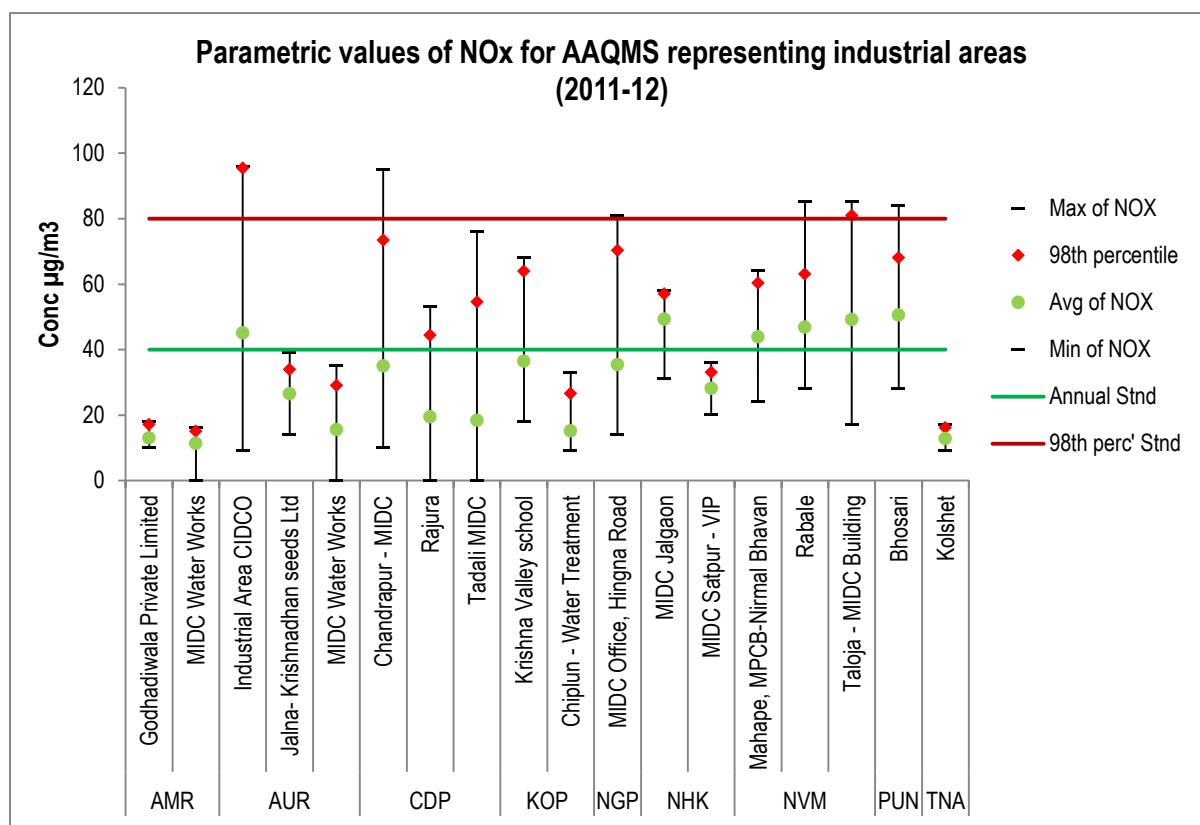


Figure No 10: Parametric values of NO_x for AAQMS representing industrial areas (2011-12)

Data Source: MPCB, 2013

The NO_x concentration in the industrial areas of Maharashtra is a matter of concern. As seen in Figure No 10, a total of 6 out of 18 AAQMS exceeded the annual average NO_x concentrations. Navi-Mumbai (Rabale and Mahape), MIDC areas of Talaja, Jalgaon and Aurangabad all exceeded the annual average standards for NO_x pollution.

The annual average and maximum NO_x readings at Aurangabad industrial area ranged between 45 to 95 µg/m³ indicating that the station not only violated the annual average standards but also exceeded the daily standards often indicating high level of pollution.

The AAQMS at MIDC Jalgaon is of major concern for NO_x pollution since the maximum and annual average NO_x concentration ranged between 58 to 49 µg/m³ indicating a very narrow range in the NO_x concentrations and high level of NO_x pollution throughout the year. Even the minimum NO_x recorded at MIDC Jalgaon was 31 µg/m³ as against the annual average standard of 40 µg/m³.

Although under standard limits the AAQMS at Kolhapur, Nagpur and Chandrapur areas recorded annual average NO_x concentrations 36.4, 35.4 and 35.0 µg/m³ respectively which is very close the annual standards (40 µg/m³). Industrial monitoring at Amravati and Thane (Kolshet) were amongst the least polluted areas in terms of NO_x pollution.

Table No 10: Data for NO_x recorded at AAQMS representing industrial areas (2011-12)

RO	Station	Max of NO _x	98th percentile	Avg of NO _x	Min of NO _x
	<i>CPCB Standards</i>	<i>80</i>	<i>80</i>	<i>40</i>	<i>80</i>
AMR	Godhadiwala Private Limited	18.0	17.1	13.0	10.0
	MIDC Water Works	16.0	15.0	11.3	0.0
AUR	Industrial Area CIDCO	96.0	95.3	45.1	9.0
	Jalna- Krishnadhan seeds Ltd	39.0	33.9	26.5	14.0
	MIDC Water Works	35.0	29.0	15.5	0.0
CDP	Chandrapur - MIDC	95.0	73.4	35.0	10.0
	Rajura	53.0	44.4	19.4	0.0
	Tadali MIDC	76.0	54.6	18.3	0.0
KOP	Krishna Valley school	68.0	63.9	36.4	18.0
	Chiplun - Water Treatment	33.0	26.6	15.2	9.0
NGP	MIDC Office, Hingna Road	81.0	70.3	35.4	14.0
NHK	MIDC Jalgaon	58.0	57.0	49.2	31.0
	MIDC Satpur - VIP	36.0	33.0	28.1	20.0
NVM	Mahape, MPCB-Nirmal Bhavan	64.0	60.3	43.9	24.0
	Rabale	85.0	63.1	46.8	28.0
	Taloja - MIDC Building	85.0	80.9	49.1	17.0
PUN	Bhosari	84.0	68.0	50.5	28.0
TNA	Kolshet	17.0	16.1	12.8	9.0

Data Source: MPCB, 2013

Units: µg/m³

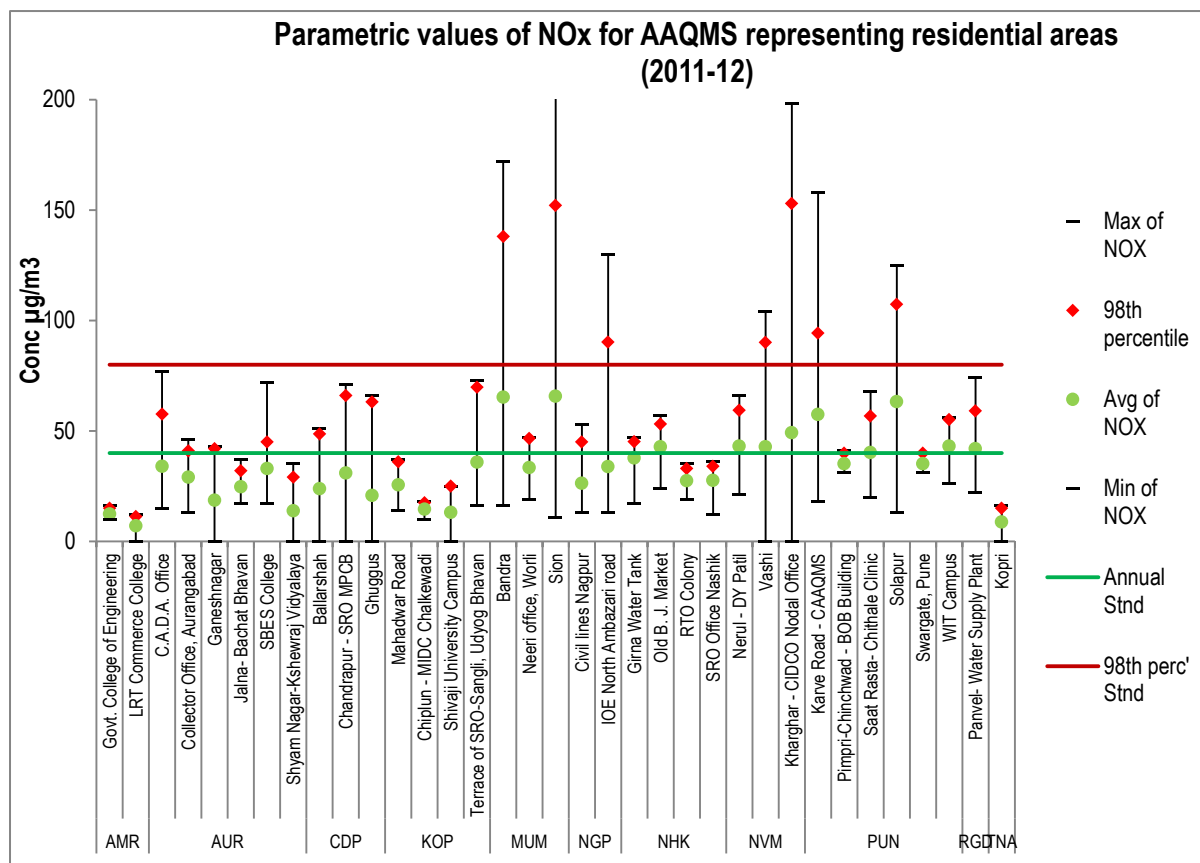


Figure No 11: Parametric values of NO_x for AAQMS representing residential areas (2011-12)

Data Source: MPCB, 2013

A total of 11 out of 31 monitoring stations representing residential region in Maharashtra violated the annual average NO_x standards of 40µg/m³.

The AAQMS at Sion and Bandra in Mumbai recorded the highest annual average NO_x concentrations of 65.7 and 65.4µg/m³ respectively. The maximum recorded NO_x concentration at Sion AAQMS was 1602.04µg/m³ which is much beyond the annual average and is an outlier since the 98th percentile reading was recorded to be 152.2µg/m³.

AAQMS at Pune region, at Swargate, Pimpri-Chinchwad and Karve road also exceeded the annual standards. Traffic congestion, owing to presence of more than 28 Lakh⁵ registered vehicles in Pune and Pimpri-Chinchwad taken together could be majorly attributed to the NO_x pollutions. This was closely followed by Navi Mumbai region (Vashi and Nerul) and Raigad regions (Panvel and Khargar) which also violated the annual standards. Proximity of monitoring stations to the highways and areas of heavy traffic congestions may also influence the NO_x levels in those regions.

Residential areas in Amravati, Aurangabad, Nagpur and Thane region were the best performing regions in terms of NO_x pollution and recorded the least annual average concentrations of NO_x.

⁵ Motor Vehicles Department, GoM 2012, [Motor Transport Statistics of Maharashtra, 2010 –11](#), Table 11, Pg 43

Table No 11: Data for NO_x recorded at AAQMS representing residential areas (2011-12)

RO	Station	Max of NO _x	98th percentile	Avg of NO _x	Min of NO _x
	CPCB Standards	80	80	40	80
AMR	Govt. College of Engineering	16.0	15.0	12.4	10.0
	LRT Commerce College	12.0	11.3	7.1	0.0
AUR	C.A.D.A. Office	77.0	57.7	34.1	15.0
	Collector Office, Aurangabad	46.0	41.0	29.1	13.0
	Ganeshnagar	43.0	42.0	18.7	0.0
	Jalna- Bachat Bhavan	37.0	32.0	24.7	17.0
	SBES College	72.0	45.0	33.0	17.0
	Shyam Nagar-Kshewraj Vidyalaya	35.0	29.0	13.9	0.0
CDP	Ballarshah	51.0	48.7	23.9	0.0
	Chandrapur - SRO MPCB	71.0	66.0	31.0	0.0
	Ghuggus	66.0	63.1	20.8	0.0
KOP	Mahadwar Road	37.0	36.0	25.7	14.0
	Chiplun - MIDC Chalkewadi	18.0	17.5	14.5	10.0
	Shivaji University Campus	25.0	25.0	13.1	0.0
	Terrace of SRO-Sangli, Udyog Bhavan	73.0	69.8	35.9	16.0
MUM	Bandra	172.0	138.0	65.4	16.0
	Neeri office, Worli	47.0	46.6	33.5	19.0
	Sion	1602.0	152.2	65.7	11.0
NGP	Civil lines Nagpur	53.0	45.0	26.3	13.0
	IOE North Ambazari road	130.0	90.2	33.9	13.0
NHK	Girna Water Tank	47.0	45.1	37.7	17.0
	Old B. J. Market	57.0	53.2	42.9	24.0
	RTO Colony	35.0	33.0	27.5	19.0
	SRO Office Nashik	36.0	34.0	27.6	12.0
NVM	Nerul - DY Patil	66.0	59.4	43.2	21.0
	Vashi	104.0	90.1	42.9	0.0
	Kharghar - CIDCO Nodal Office	198.0	153.0	49.3	0.0
PUN	Karve Road - CAAQMS	158.0	94.2	57.5	18.0
	Pimpri-Chinchwad - BOB Building	41.0	40.0	35.2	31.0
	Saat Rasta- Chithale Clinic	68.0	56.8	40.2	20.0
	Solapur	125.0	107.4	63.4	13.0
	Swargate, Pune	40.0	40.0	35.2	31.0
	WIT Campus	56.0	55.1	43.1	26.0
RGD	Panvel- Water Supply Plant	74.0	59.1	42.0	22.0
TNA	Kopri	16.0	15.0	8.8	0.0

Data Source: MPCB, 2013

Units: µg/m³

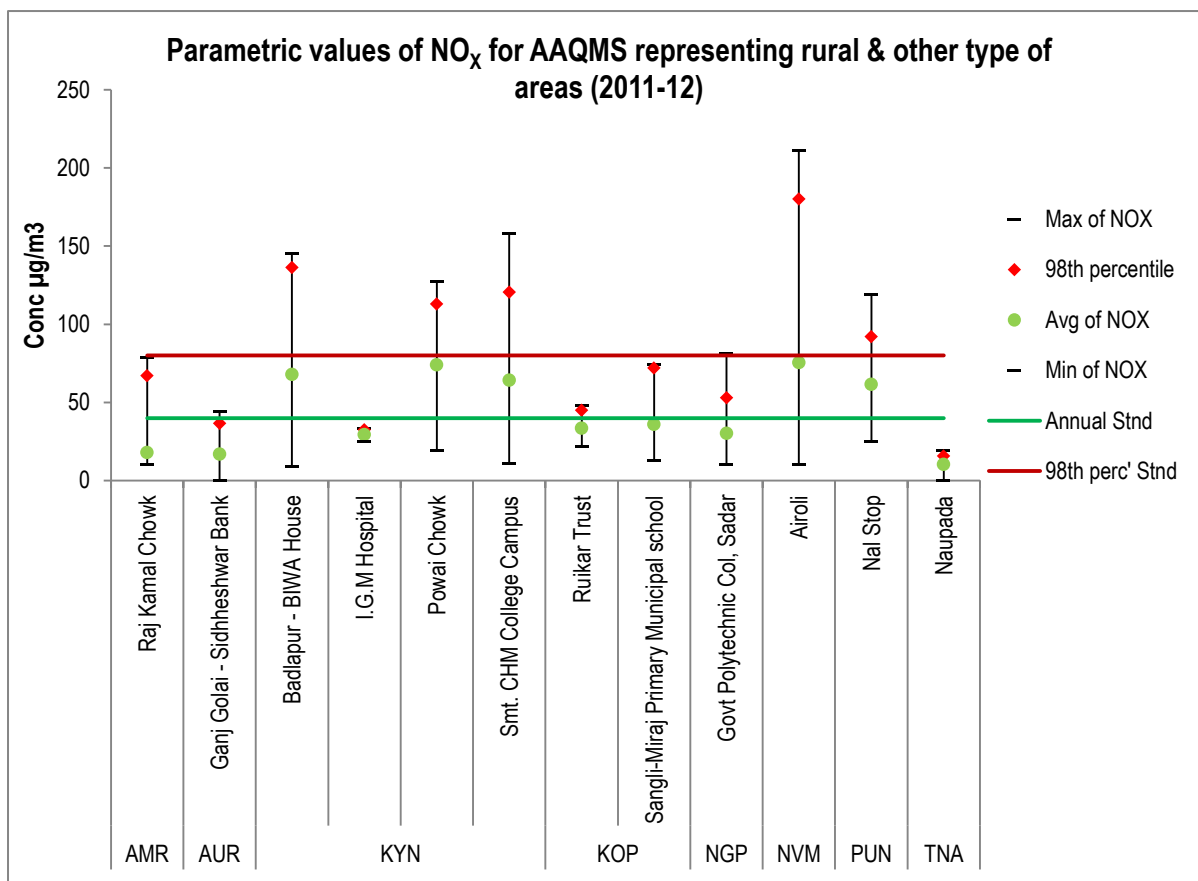


Figure No 12: Parametric values of NO_x for AAQMS representing rural & other type of areas (2011-12)

Data Source: MPCB, 2013

AAQMS at Airoli, Badlapur, Bhiwandi (Powai chowk), Ulhasnagar (CHM College), Pune (Nal Stop), representing the rural and other areas in Maharashtra all exceeded the annual standards for NO_x (Figure No 12).

The annual average at Airoli and Bhiwandi were recorded to be 75.4 and 74.1µg/m³ respectively which is almost double the annual standard for NO_x. The maximum NO_x concentration recorded at Airoli, Ulhasnagar and Badlapur were 211, 158 and 145µg/m³ respectively.

Amravati, Aurangabad, Nagpur and Kolhapur recorded NO_x concentration well within the standards. Naupada AAQMS at Thane recorded the least annual average NO_x concentration of 10µg/m³.

Table No 12: Data for NO_x recorded at AAQMS representing rural and other types of areas (2011-12)

RO	Station	Max of NO _x	98th percentile	Avg of NO _x	Min of NO _x
	<i>CPCB Standards</i>	<i>80</i>	<i>80</i>	<i>40</i>	<i>80</i>
AMR	Raj Kamal Chowk	79.0	67.0	17.9	10.0
AUR	Ganj Golai - Sidhsheshwar Bank	44.0	36.5	17.0	0.0
KYN	Badlapur - BIWA House	145.0	136.2	67.9	9.0
	I.G.M Hospital	33.0	32.5	29.3	25.0
	Powai Chowk	127.0	113.0	74.1	19.0
	Smt. CHM College Campus	158.0	120.6	64.1	11.0
KOP	Ruikar Trust	48.0	45.0	33.5	22.0
	Sangli-Miraj Primary Municipal school	74.0	71.9	35.9	13.0
NGP	Govt Polytechnic Col, Sadar	81.0	53.0	30.2	10.0
NVM	Airoli	211.0	180.0	75.4	10.0
PUN	Nal Stop	119.0	92.0	61.6	25.0
TNA	Naupada	19.0	15.6	10.3	0.0

Data Source: MPCB, 2013

Units: µg/m³

*Note: IGM Hospital is categorized as a sensitive type of monitoring zone by MPCB

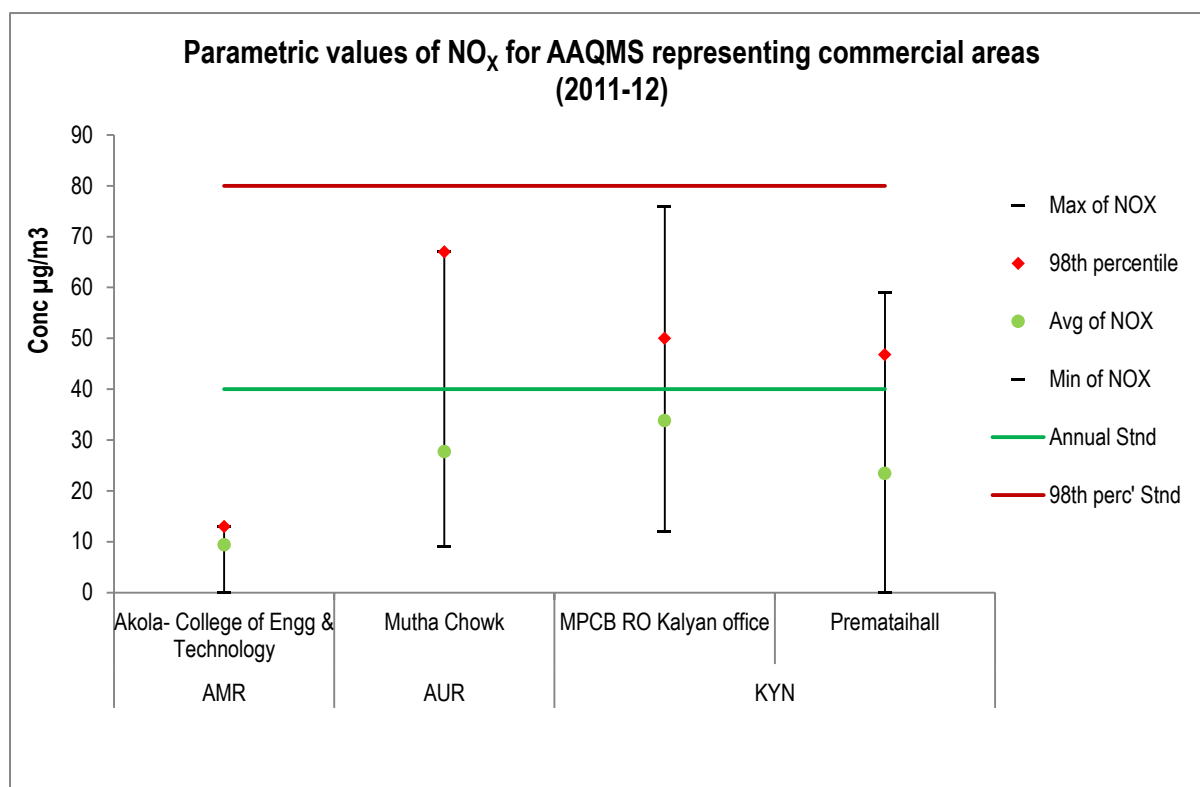


Figure No 13: Parametric values of NO_x for AAQMS representing commercial areas (2011-12)

Data Source: MPCB, 2013

As seen in Figure No 13, the AAQMS representing commercial areas recorded annual NO_x concentrations within the annual standards. None of the stations violated the annual or the daily standards. Although the AAQMS at MPCB office at Kalyan, recorded the highest NO_x value of 76µg/m³ the AAQMS at Aurangabad (Mutha Chowk) recorded the same reading for maximum as well as 98th percentile reading for NO_x concentration (67µg/m³).

Table No 13: Data for NO_x recorded at AAQMS representing commercial areas (2011-12)

RO	Station	Max of NO _x	98th percentile	Avg of NO _x	Min of NO _x
<i>CPCB Standards</i>		80	80	40	80
AMR	Akola- College of Engg & Technology	13.0	13.0	9.4	0.0
AUR	Mutha Chowk	67.0	67.0	27.7	9.0
KYN	MPCB RO Kalyan office	76.0	50.0	33.8	12.0
	Prematai hall	59.0	46.8	23.4	0.0

Data Source: MPCB, 2013

Units: µg/m³

Respirable Suspended Particulate Matter (RSPM)

Particulate Matter is a complex mixture of fine particles and aerosols, and is also known as particle pollution. It is made up of a number of components, including acids (such as nitrates and sulfates), organic chemicals, metals, and dust particles. Particles that are 10 micrometers in diameter or smaller can pass through the throat and nose and enter the lungs and are commonly referred to as RSPM (Respirable Suspended Particulate Matter). They are even smaller than human hair follicle and finest of the sand particles (Figure No 14). Once inhaled, these particles can affect the heart and lungs and cause serious health effects.

Various studies prove the relationship of high PM and respiratory problems. Statistical analysis of data indicate a relationship between increase in particulate concentration and rises in the number of hospital visits for upper respiratory infections, cardiac diseases, bronchitis, asthma, pneumonia, emphysema and so on. Studies also indicate that much of the PM in the atmosphere is carcinogenic in nature. In some cases it has been observed that exposure to particulate in combination with other pollutants such as SO₂ produces more severe health deterioration than exposure to each pollutant separately.

Several specific substances which are constituents of PM have been observed to cause some damage to plants and vegetation. Particles containing fluorides appear to cause some plant damage, and magnesium oxide falling on agricultural soils has resulted in poor plant growth. PM affects visibility in a region. Due to absorption and scattering of light by airborne particulates, the visibility tends to reduce. PM can affect painted surfaces, clothing, and curtains just by settling on them. Also, PM is known to cause direct chemical damage by corrosion.

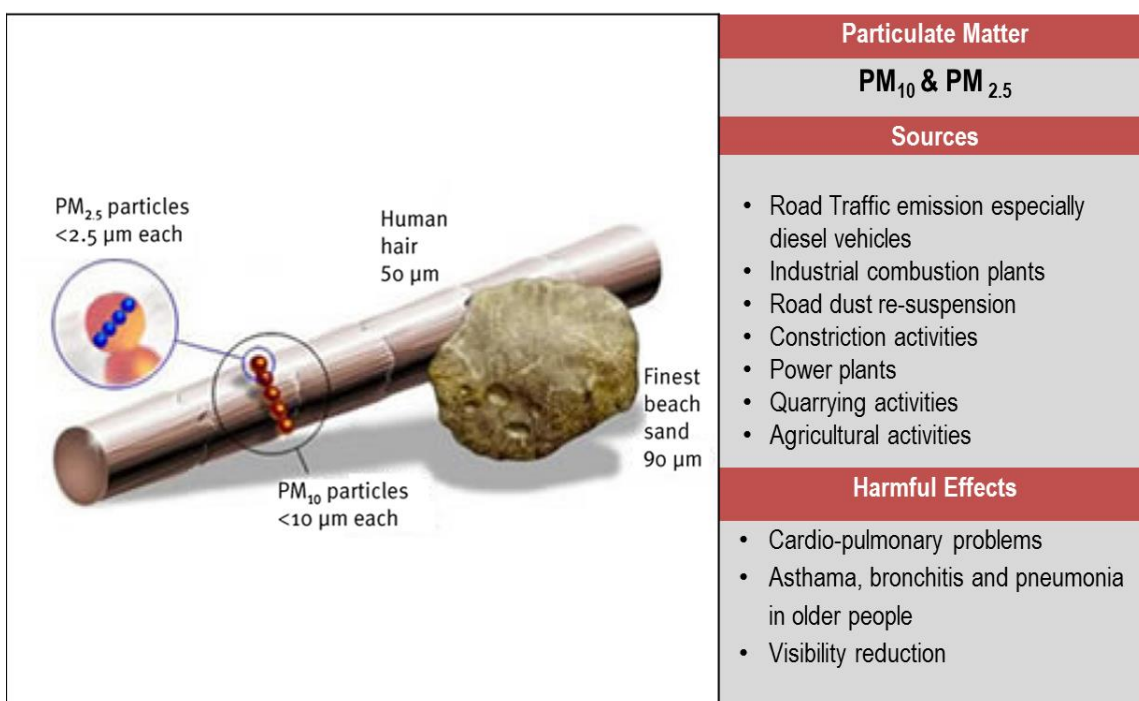


Figure No 14: Size difference between PM_{2.5} and PM₁₀, their sources and harmful impacts of Particulate Matter

Data Source: [Parivesh ENVIS, CPCB](#)

Status of RSPM

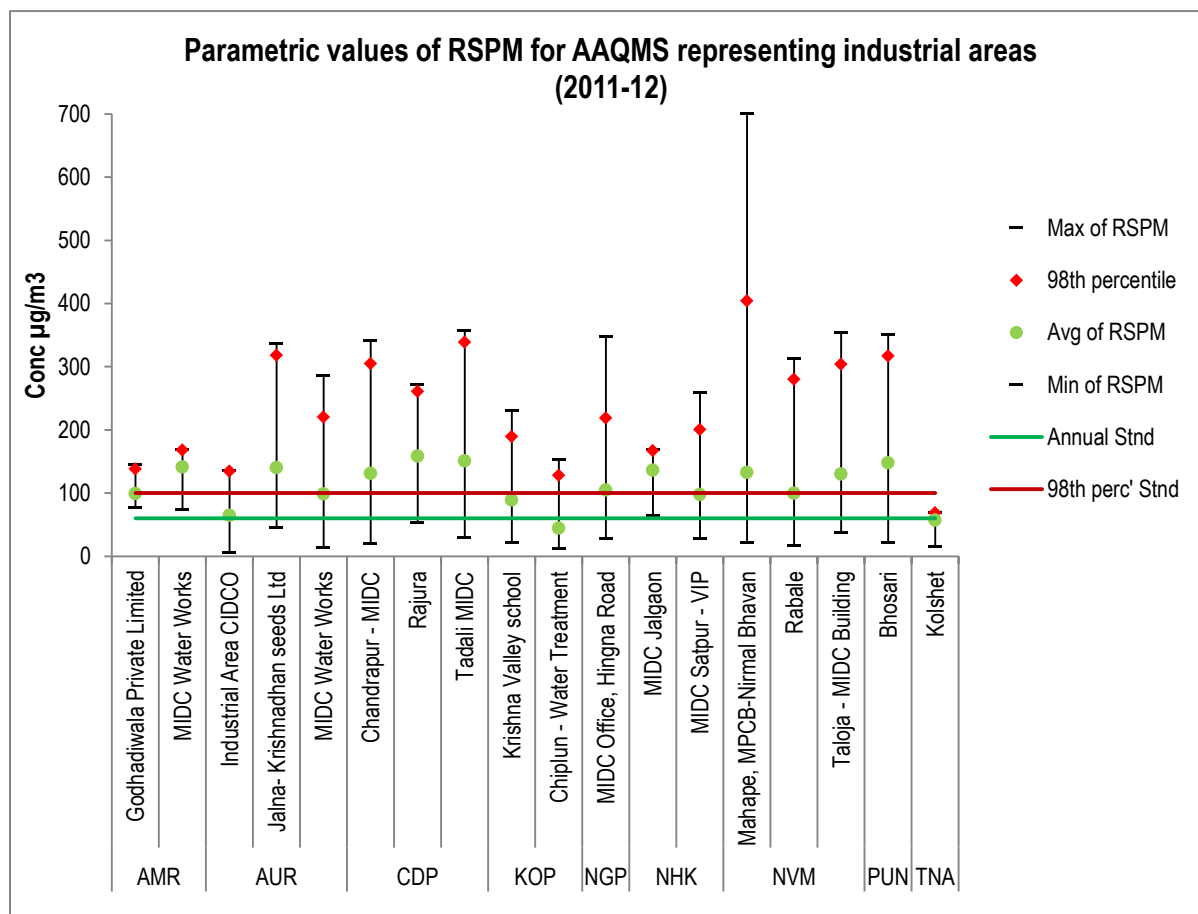


Figure No 15: Parametric values of RSPM for AAQMS representing industrial areas (2011-12)

Data Source: MPCB, 2013

Except for MIDC region at Lote and Chiplun - Water Treatment, RSPM concentrations recorded at all the AAQMS representing industrial regions exceeded the annual average standards set by CPCB ($60\mu\text{g}/\text{m}^3$).

A peak daily reading of RSPM was recorded at the AAQMS installed at MPCB's office at Mahape. The same station also recorded the highest 98th percentile concentration of $404.1\mu\text{g}/\text{m}^3$. One may attribute this to the presence of quarry sites, TTC industrial area and Mumbai Pune highway in very close vicinity of the monitoring station.

Although the industrial area of CIDCO at Aurangabad has high levels of SO_2 and NO_x concentrations the AAQMS recorded an annual average of $65\mu\text{g}/\text{m}^3$ of RSPM, which is very less as compared to other regions.

RSPM monitoring at Amravati has very less range between its minimum and maximum values. With the minimum value of RSPM, 77 and $74\mu\text{g}/\text{m}^3$, at A-23 MIDC also exceeding the annual average standards the region needs immediate action.

Table No 14: Data for RSPM recorded at AAQMS representing industrial region (2011-12)

RO	Station	Max of RSPM	98th percentile	Avg of RSPM	Min of RSPM
	CPCB Standards	100	100	60	100
AMR	Godhadiwala Private Limited	145.0	138.4	99.6	77.0
	MIDC Water Works	169.0	168.1	141.3	74.0
AUR	Industrial Area CIDCO	136.0	135.0	65.0	6.0
	Jalna- Krishnadhan seeds Ltd	337.0	318.3	140.1	46.0
	MIDC Water Works	286.0	220.6	99.0	14.0
CDP	Chandrapur - MIDC	342.0	305.1	131.2	20.0
	Rajura	272.0	260.8	158.8	54.0
	Tadali MIDC	357.0	338.8	151.0	30.0
KOP	Krishna Valley school	230.0	189.3	89.4	22.0
	Chiplun - Water Treatment	153.0	128.0	44.8	12.0
NGP	MIDC Office, Hingna Road	347.0	219.1	104.9	28.0
NHK	MIDC Jalgaon	169.0	167.0	136.5	65.0
	MIDC Satpur - VIP	259.0	200.9	98.0	28.0
NVM	Mahape, MPCB-Nirmal Bhavan	700.0	404.1	132.8	22.0
	Rabale	312.0	280.3	100.1	17.0
	Taloja - MIDC Building	354.0	303.8	130.3	37.0
PUN	Bhosari	350.0	317.2	148.0	22.0
TNA	Kolshet	69.0	69.0	57.5	16.0

Data Source: MPCB, 2013

Units: µg/m³

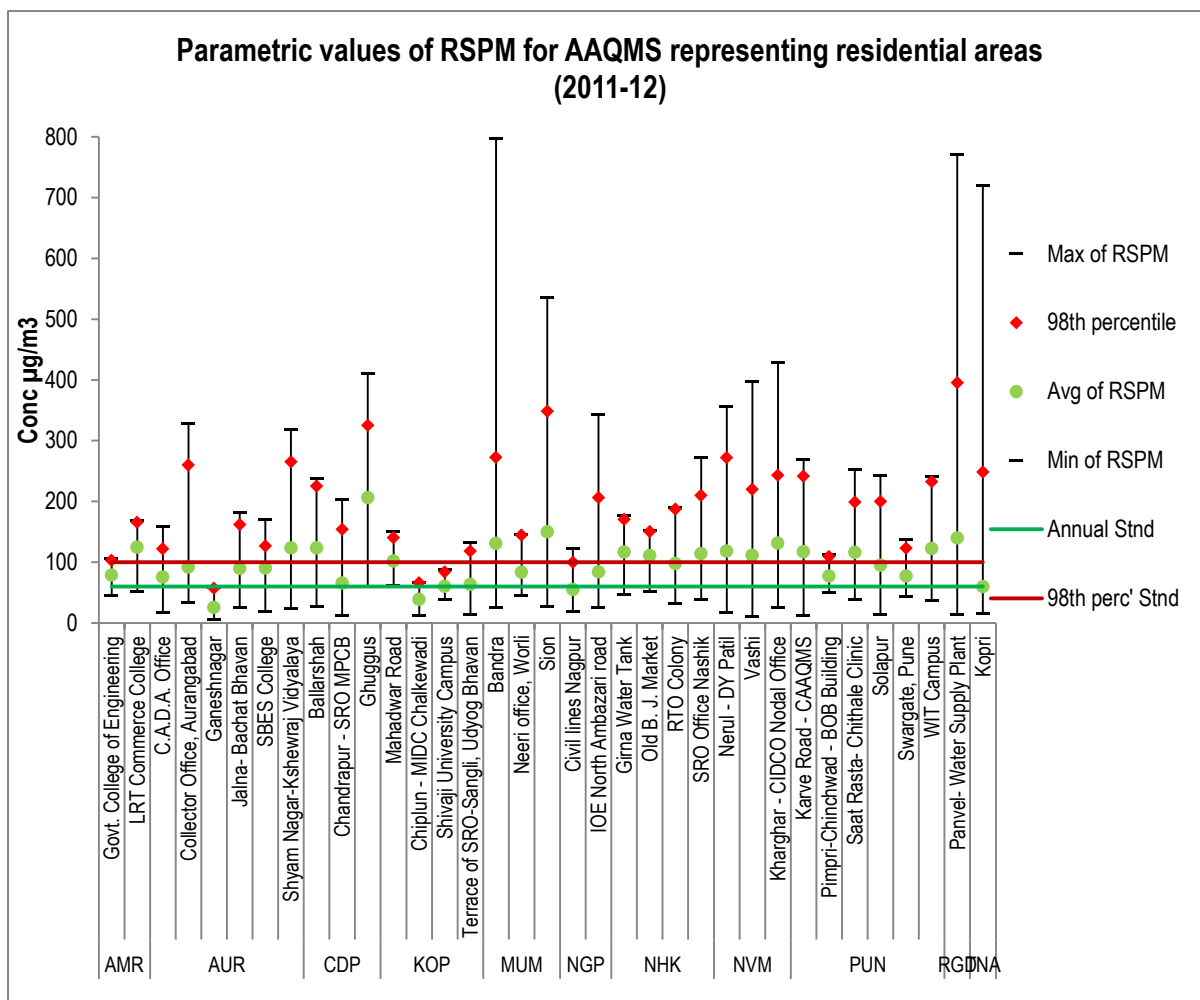


Figure No 16: Parametric values of RSPM for AAQMS representing residential areas (2011-12)

Data Source: MPCB, 2013

All the monitoring stations representing residential areas in Maharashtra also exceeded the annual average standards for RSPM. The peak 98th percentile value for RSPM concentration was recorded at Panvel AAQMS, 395.5µg/m³ which is almost 4 times the daily standards.

High levels of RSPM were also recorded by AAQMS at Sion and Bandra, 149.8 and 130.8µg/m³ respectively which are more than double the annual standards (60µg/m³). The AAQMS at Pune have the least range between the parametric values indicating that at any given time the RSPM pollution levels in the Pune are higher.

AAQMS at Aurangabad (Ganeshnagar) was the only AAQMS which recorded RSPM concentrations within standard values.

Table No 15: Data for RSPM recorded at AAQMS representing residential region (2011-12)

RO	Station	Max of RSPM	98th percentile	Avg of RSPM	Min of RSPM
	CPCB Standards	100	100	60	100
AMR	Govt. College of Engineering	106.0	103.0	78.7	45.0
	LRT Commerce College	168.0	165.3	124.5	52.0
AUR	C.A.D.A. Office	158.0	121.9	75.3	17.0
	Collector Office, Aurangabad	328.0	259.9	91.6	33.0
	Ganeshnagar	58.0	57.0	25.5	5.0
	Jalna- Bachat Bhavan	181.0	162.0	89.4	26.0
	SBES College	170.0	126.6	90.0	19.0
	Shyam Nagar-Kshewraj Vidyalaya	318.0	265.3	123.5	23.0
CDP	Ballarshah	237.0	225.3	123.3	27.0
	Chandrapur - SRO MPCB	203.0	154.1	65.6	12.0
	Ghuggus	410.0	324.9	206.2	59.0
KOP	Mahadwar Road	150.0	140.3	101.8	61.0
	Chiplun - MIDC Chalkewadi	67.0	66.1	38.3	11.0
	Shivaji University Campus	88.0	83.8	60.2	39.0
	Terrace of SRO-Sangli, Udyog Bhavan	132.0	118.0	63.4	13.0
MUM	Bandra	797.0	272.7	130.8	24.0
	Neeri office, Worli	146.0	144.3	83.5	45.0
	Sion	535.0	348.2	149.8	27.0
NGP	Civil lines Nagpur	122.0	99.5	54.6	19.0
	IOE North Ambazari road	343.0	205.9	83.8	24.0
NHK	Girna Water Tank	177.0	170.3	116.3	46.0
	Old B. J. Market	151.0	150.0	110.7	52.0
	RTO Colony	190.0	186.9	97.7	32.0
	SRO Office Nashik	272.0	209.8	113.6	39.0
NVM	Nerul - DY Patil	357.0	272.1	117.9	17.0
	Vashi	398.0	219.7	111.4	10.0
	Kharghar - CIDCO Nodal Office	428.0	243.0	131.4	26.0
PUN	Karve Road - CAAQMS	269.0	241.2	117.2	12.0
	Pimpri-Chinchwad - BOB Building	113.0	109.3	77.1	50.0
	Saat Rasta- Chithale Clinic	252.0	198.5	115.7	38.0
	Solapur	242.0	199.6	94.7	14.0
	Swargate, Pune	137.0	122.9	77.2	44.0
	WIT Campus	241.0	232.6	122.3	36.0
RGD	Panvel- Water Supply Plant	771.0	395.5	139.6	14.0
TNA	Kopri	720.0	248.4	59.6	15.0

Data Source: MPCB, 2013

Units: $\mu\text{g}/\text{m}^3$

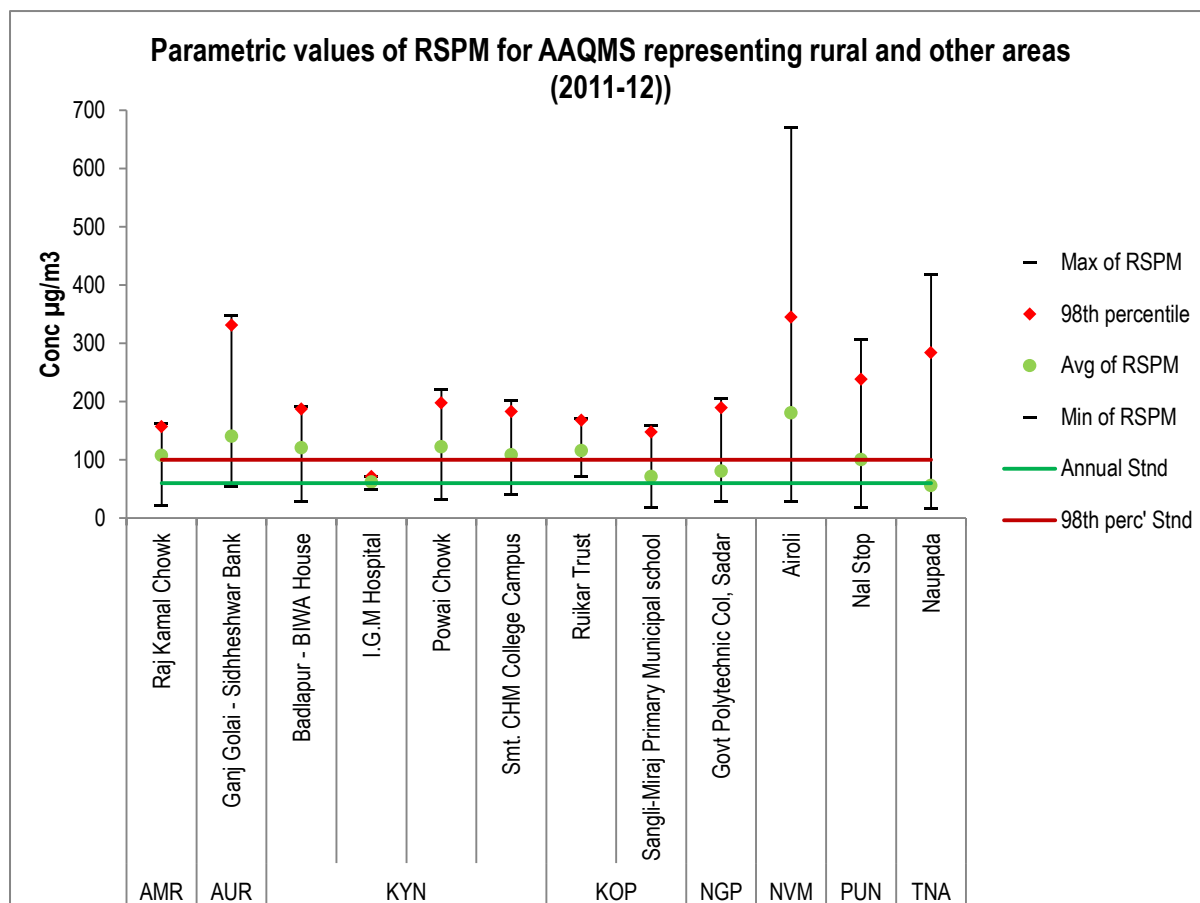


Figure No 17: Parametric values of RSPM for AAQMS representing rural and other areas (2011-12)

Data Source: MPCB, 2013

*Note: IGM Hospital is categorized as a sensitive type of monitoring zone by MPCB

As seen in Figure No 17, the annual average of RSPM values for the AAQMS areas representing rural and other areas not only exceed the annual standards but also recorded annual averages even higher than the daily standards.

AAQMS at Navi Mumbai (Airoli) recorded an annual average of 180.8µg/m³ of RSPM, followed by Aurangabad (Siddheshwar Sahakari Bank) 140.5µg/m³. The parametric values for RSPM at Kolhapur were found to have less fluctuations indicating higher level of RSPM pollution throughout the year.

Thane (Naupada) was the only AAQMS which recorded annual average of RSPM within the standards (56µg/m³) out of all the AAQMS representing rural and other areas.

Table No 16: Data for RSPM recorded at AAQMS representing rural & other types of areas (2011-12)

RO	Station	Max of RSPM	98th percentile	Avg of RSPM	Min of RSPM
	CPCB Standards	100	100	60	100
AMR	Raj Kamal Chowk	162.0	156.9	107.6	22.0
AUR	Ganj Golai - Sidhshwar Bank	348.0	331.6	140.5	53.0
KYN	Badlapur - BIWA House	191.0	187.2	120.9	28.0
	I.G.M Hospital	72.0	71.5	62.2	49.0
	Powai Chowk	221.0	198.0	122.3	32.0
	Smt. CHM College Campus	202.0	182.8	108.9	41.0
KOP	Ruikar Trust	171.0	168.0	116.1	72.0
	Sangli-Miraj Primary Municipal school	159.0	147.9	71.6	18.0
NGP	Govt Polytechnic Col, Sadar	206.0	189.7	80.5	29.0
NVM	Airoli	671.0	345.1	180.8	28.0
PUN	Nal Stop	306.0	238.7	100.3	18.0
TNA	Naupada	418.0	284.2	56.0	16.0

Data Source: MPCB, 2013

Units: $\mu\text{g}/\text{m}^3$

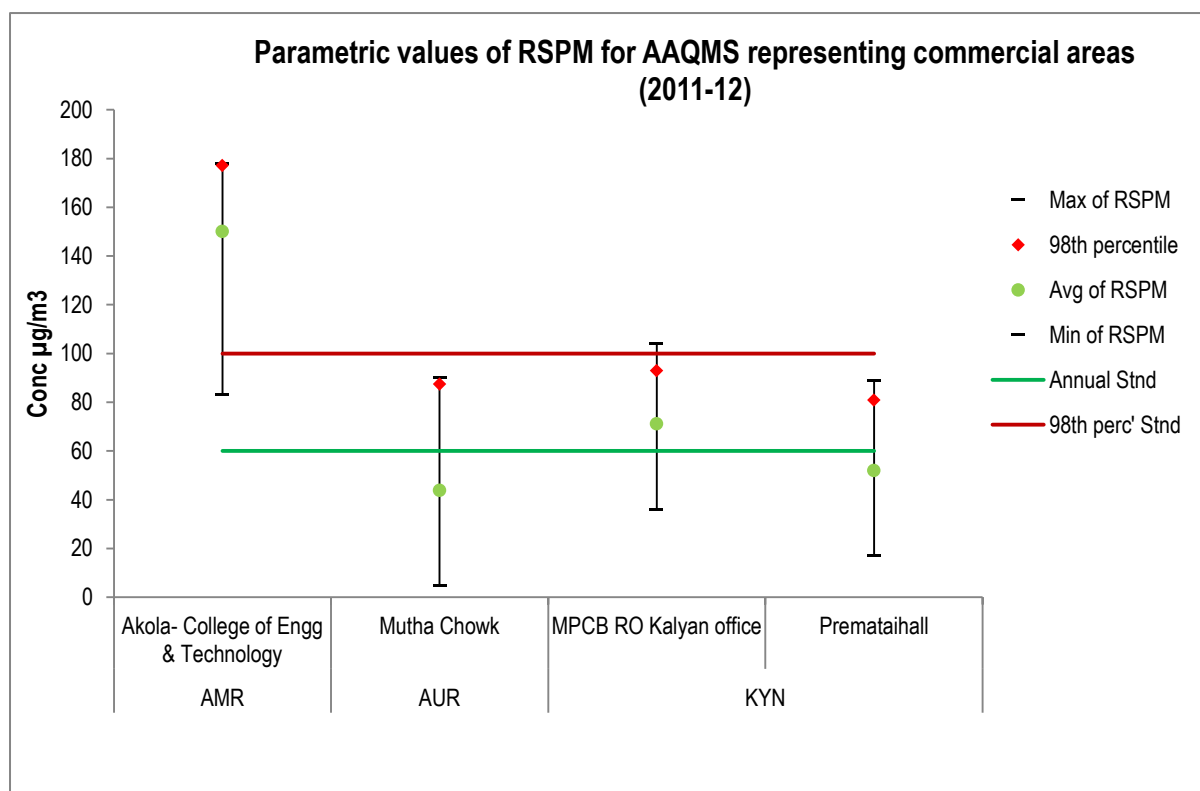


Figure No 18: Parametric values of RSPM for AAQMS representing commercial areas (2011-12)

Data Source: MPCB, 2013

Contrary to the SO₂ and NO_x pollution which were well below standards for the commercial areas, RSPM pollution was found to exceed the standards at 2 commercial locations Amravati and Kalyan. Among the commercial areas Amravati recorded the highest pollution levels for RSPM with the maximum value of 178µg/m³ and the average annual concentration of 150.1µg/m³. AAQMS at Kalyan RO of MPCB also violated the annual standards and recorded annual average RSPM concentrations of about 71.2µg/m³. Annual RSPM levels at Bhiwandi (Prematai hall) also were close to the annual average standards.

Table No 17: Data for RSPM recorded at AAQMS representing commercial areas (2011-12)

RO	Station	Max of RSPM	98th percentile	Avg of RSPM	Min of RSPM
CPCB Standards		100	100	60	100
AMR	Akola- College of Engg & Technology	178.0	177.2	150.1	83.0
AUR	Mutha Chowk	90.0	87.5	43.9	5.0
KYN	MPCB RO Kalyan office	104.0	92.9	71.2	36.0
	Prematai hall	89.0	80.9	52.0	17.0

Data Source: MPCB, 2013

Units: µg/m³

Carbon Monoxide

Partial oxidation of carbon-containing compounds leads to production of CO (Carbon monoxide); it forms when there is not enough oxygen to produce CO₂ (carbon dioxide), such as when operating a stove or an internal combustion engine in an enclosed space. CO has no colour, odour or taste and is highly toxic to humans and animals at higher concentrations. Although CO has a half-life of 5 hours in fresh air, it combines with haemoglobin to produce carboxy-haemoglobin, which occupies the space in haemoglobin that normally carries oxygen, and hence is a toxic gas. It is known to reduce the oxygen carrying capacity of blood, causes headaches, nausea, and dizziness and at high concentrations can lead to death. Partial combustion of petroleum products in vehicles and, emissions from gas stoves are some of the major sources of CO emissions.

CO is monitored at select locations in Maharashtra. For the year 2011-12 the data for CO monitored by the CAAQMS at Pune, Bandra has been presented in **Figure No 19**

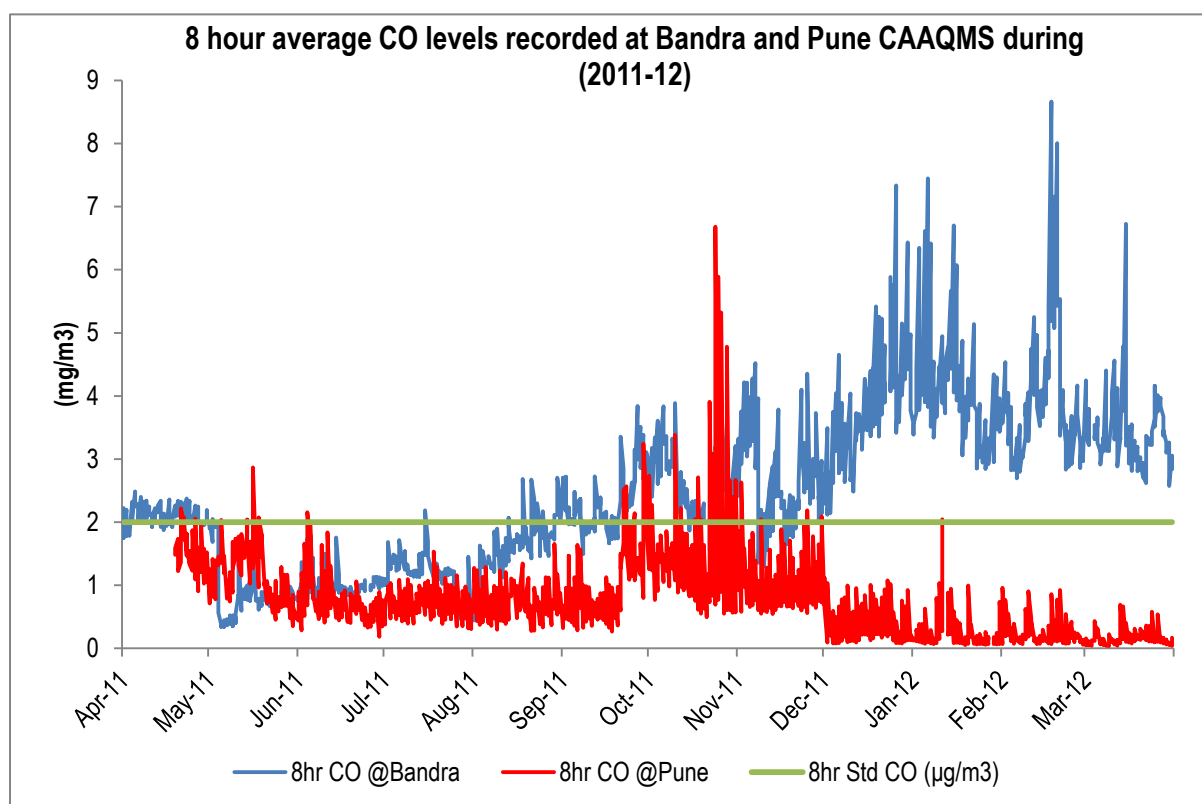


Figure No 19: 8 hour average CO levels recorded at Bandra and Pune CAAQMS (2011-12)

High 8 hour average concentration of CO were recorded, (exceeding the standard of 2mg/m³) at Bandra and Pune monitoring station. The percentage exceedence was 61.1 and 3.7% at Bandra and Pune respectively. 8 hour CO levels in months of December exceeded the permissible limit at Bandra monitoring station. Reasons for such alarmingly higher concentration could be attributed to metrological condition prevailing in winter which prevents pollutants from rising/dispersing at lower layer of atmosphere. Hence absence of vertical mixing of pollutants frequently deteriorates the air quality during winter months. The levels of CO were majorly below permissible limit at Pune monitoring station.

Ozone

O₃ (Ozone) is secondary pollutant, formed when NO_x and VOCs undergo a photochemical reaction in the atmosphere. People who are active outdoors, especially in hot sunny days are more vulnerable to the harmful impacts of O₃. Children are also more likely than adults to have asthma as an impact of O₃ pollution. Breathing ozone can trigger a variety of health problems including chest pain, coughing, throat irritation, and congestion. It can worsen bronchitis, emphysema, and asthma. Ground level ozone also can reduce lung function and inflame the linings of the lungs. Repeated exposure may permanently scar lung tissue.

Ozone is monitored at select locations in Maharashtra. The data for ozone monitored by the CAAQMS at Pune, Bandra for the year 2011-12 has been presented in Figure No 20.

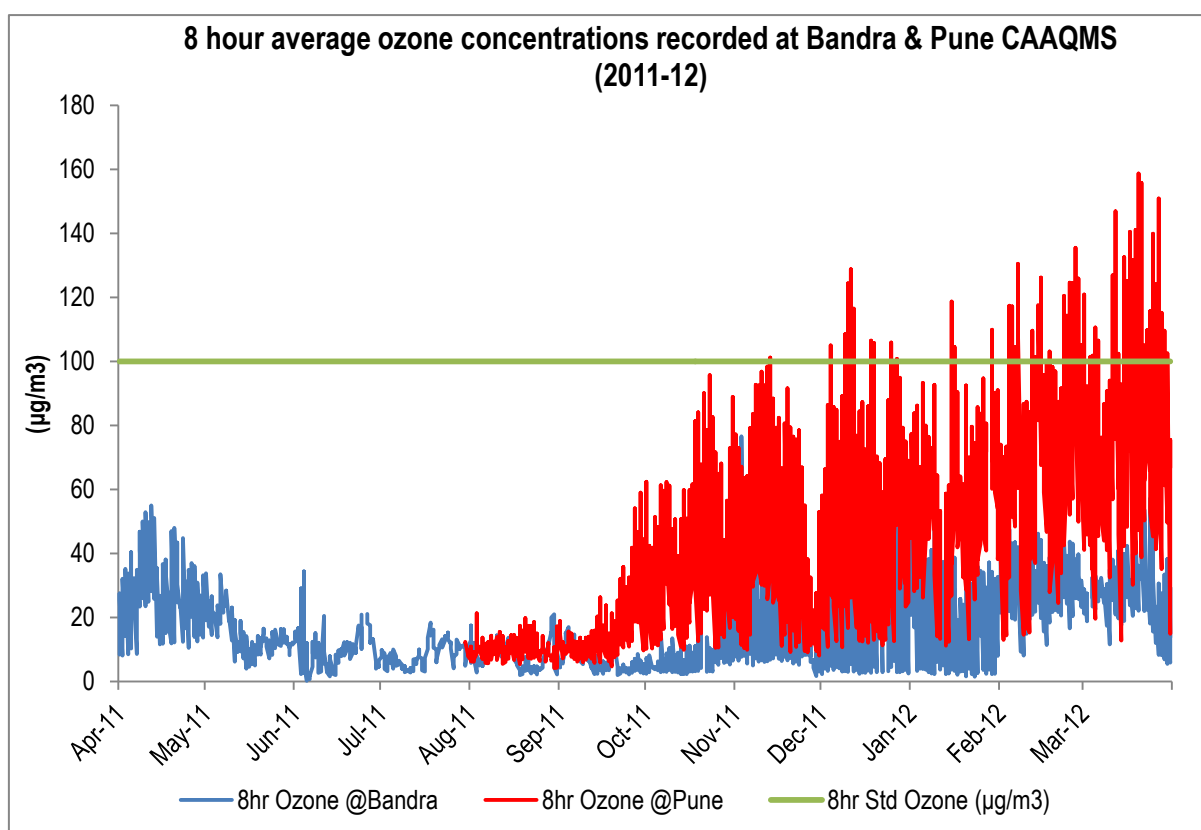


Figure No 20: 8 hour average ozone concentrations recorded at Bandra & Pune CAAQMS (2011-12)

8 hour average concentration of ozone was recorded moderately high at Pune monitoring station, (exceeding the standard of 100µg/m³). The percentage exceedence in ozone concentrations were nil at Bandra station and 8.1% at Pune monitoring station. Data for ozone were not recorded between April and July month at Pune. The concentrations were slightly higher than permissible limit, intermittently. Reason for slightly higher ozone condition in Pune could be attributed to prevailing weather conditions and complex chemistry in formation of ozone involving hydrocarbons and nitrogen oxides in presence of sunlight.

Benzene

Benzene (C₆H₆) is a colourless sweet smelling liquid and is generated whenever carbon-rich materials undergo incomplete combustion. Combustion of aromatic compounds, evaporation during fuelling, tobacco smoke, furniture wax and glue paints are some of the major sources of benzene pollution. The natural sources include volcanoes and forest fires. Benzene increases the risk of cancer and other illnesses. Benzene is a notorious cause of bone marrow failure. Substantial quantities of epidemiologic, clinical, and laboratory data link benzene to aplastic anaemia, acute leukaemia, and bone marrow abnormalities. Benzene targets liver, kidney, lung, heart and the brain and can cause strand breaks of the DNA (Deoxyribonucleic acid), ultimately leading to chromosomal damage.

Benzene pollution was recorded at 2 CAAQMS, Bandra and Pune. The annual average benzene concentrations were recorded to be 2.65 and 0.03µg/m³ respectively. The annual average standards for benzene have been set as 5µg/m³ by CPCB, indicating that the benzene pollution at both the locations were well below the permissible limits. However the highest 1 hour ozone concentration recorded at Bandra and Pune were 164.38 and 2.41µg/m³ respectively.

Conclusion

Urbanization, industrialization, vehicular emissions, construction sector, quarrying and mining activities and so on are some of the major drivers for air pollution in Maharashtra. MPCB has been implementing strategies for air monitoring and has the highest number of AAQMS under NAMP in India. As a result, MPCB records massive amount of datasets which was used in this report, to present an overview on the status of concentration for various air pollutants recorded at 69 AAQM stations.

Out of all the measured parameters including, SO₂, NO_x, RSPM, CO, benzene and Ozone the main and primary pollutant was RSPM (PM₁₀) followed by NO_x. RSPM was found to exceed the annual standards at 16 out of 18 stations representing industrial locations, 31 out of 35 in residential locations, 11 out of 12 at rural and other types in the year 2011-12. It was found that 45% times the particulate concentration in ambient air exceeded daily standards.

The NO_x concentration values exceeded at 6 out of 18 at industrial areas, 11 out of 35 at residential areas and 5 out of 12 at rural and other types in the year 2011-12. Annual trends were found to be less conclusive, proposing the needs for implementation of control measure for areas with higher exposure of NO_x. SO₂ pollution posed no threat as its annual average readings were recorded to be below standards at all the monitoring stations.

CO and Ozone are among 6 major pollutants commonly found in urban environment and have the potential to harm human health and properties, but the monitoring of CO and Ozone was limited to Bandra and Pune monitoring station. It was found that the relation is seasonal as well as region-based for these two pollutants. Upon comparing with national CO standards it was observed that 61% times the CO levels exceeded in Bandra, whereas in Pune it was majorly found to be below the permissible limits. Ozone stood as non-polluting at Bandra, whereas in Pune data available for 8 months showed an exceedence for 8% of the observations.

However, given the fact that Maharashtra is the most urbanized and highly industrialized augmenting new AAQMS to the existing network is highly desired. Rapidly developing regions and regions which are yet to have a regular AAQM stations should be prioritized. A road map to be developed to strengthen the monitoring network. Areas like Badlapur, Ulhasnagar, Chandrapur and so on which recorded high pollutant concentrations in 2011-12 should be considered for installing CAAQMS.

Source apportionment study should be undertaken for highly urbanized and industrialized areas of Mumbai, Pune Kalyan and Navi Mumbai. This shall help in identifying the region specific source of emission and devise specific strategies to reduce the concentration of respective pollutants.

Annex – I: List of AAQMS in Maharashtra 2011-12

RO	Region	Program	Station	Location	Type	
Amravati	Amravati	NAMP	Godhadiwala Private Limited	Building of Apurva Oil Industries	Industrial	
			Govt. College of Engineering	Terrace of Govt. Coll. Of Engi., Electronic & Computer Building Amravati	Residential	
			Raja Kamal Chowk, Amravati	Vanita Samaj Building	Rural & other areas	
	Akola	NAMP	College of Eng. And Technology Akola (Architecture of branch)	Akola	Commercial	
			LR College of Engg	Plot No. 10 Ranpise Nagar professor Colony	Residential	
			MIDC Water Works	Phase II, MIDC	Industrial	
	Aurangabad	Aurangabad	NAMP	C.A.D.A. Office	C.A.D.A. Office , Garkheda Aurangabad	Residential
				Collector Office, Aurangabad	Collector Office	Residential
				SBES College	SBES College Campus, Aurangabad	Residential
Jalna		NAMP	Jalna- Bachat Bhavan	Bachat Bhavan Building Jalna	Residential	
			Jalna- Krishna Dhan	Krishna Dhan Compound Jalna	Industrial	
			Latur	NAMP	MIDC Water Works	Latur
Terrace of Kshewraj Vidyalaya	Latur	Residential				
Terrace of Sidhshwar Sahakari Bank	Ganjgolai, Latur	Rural & other areas				

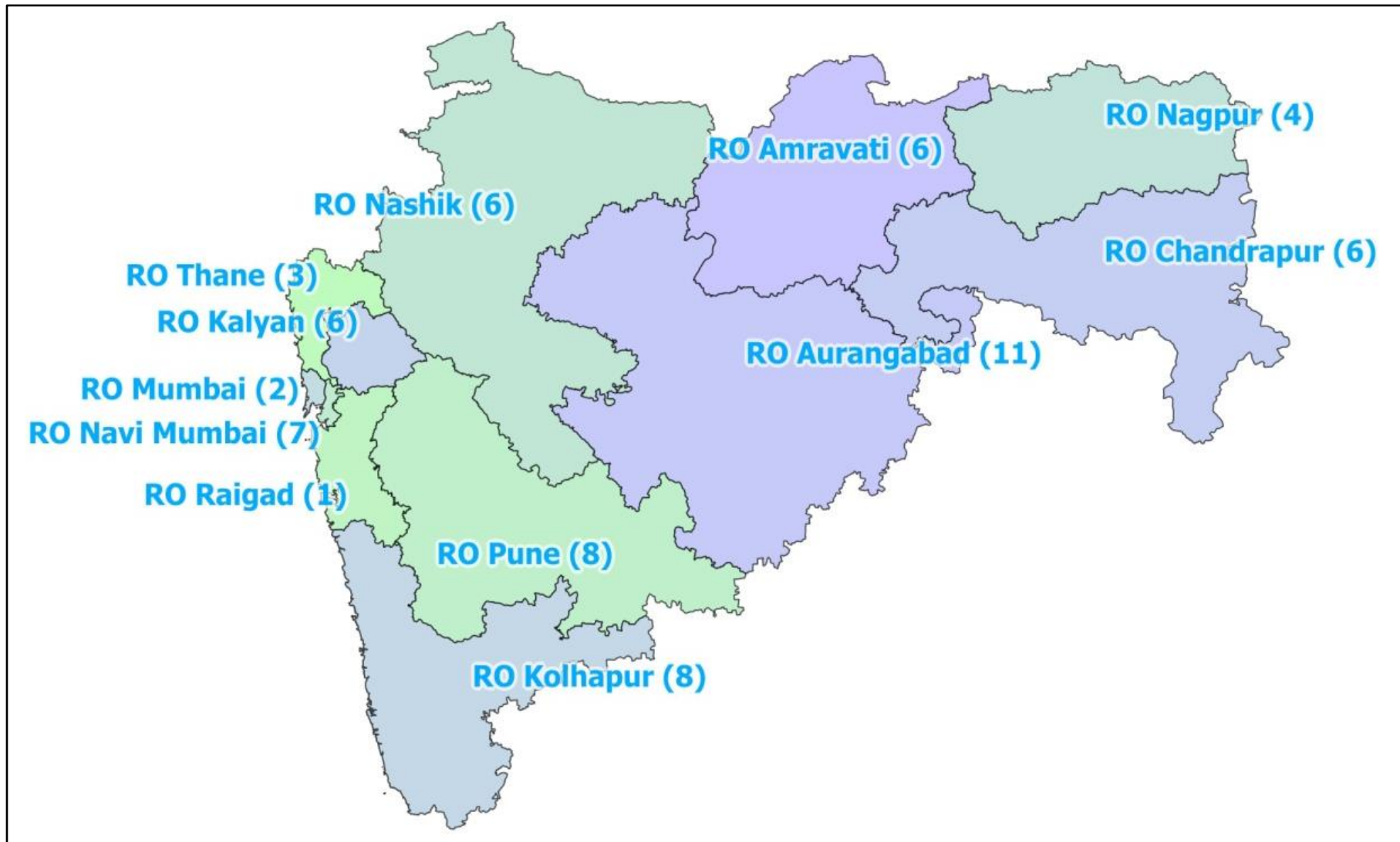
RO	Region	Program	Station	Location	Type	
Chandrapur	Nanded	NAMP	Ganeshnagar	Nanded	Residential	
			Industrial Area CIDCO	Nanded	Industrial	
			MuthaChowk	Nanded	Commercial	
	Chandrapur	NAMP	Ballarshah	Ballarpur	Residential	
			Ghuggus	Office of Grampanchayat Ghuggus	Residential	
			MIDC, Chandrapur	M/s Multiorganic Pvt. Ltd. Chandrapur	Industrial	
			Rajura	Chandrapur	Industrial	
			SRO Office, Chandrapur	Office of Nagar Parishad Chandrapur Premises	Residential	
	Kalyan	NAMP	Tadali MIDC	MIDC	Industrial	
			Ambernath	Ambernath	Ambernath Municipal Council Building, Ambernath	Rural & other areas
Badlapur			Badlapur	BIWA Office, Badlapur	Rural & other areas	
Bhiwandi			SAMP	I.G.MHospital	Bhiwandi	Sensitive
				Premataihall	Bhiwandi	Commercial
Dombivali	NAMP	Dombivali	CETP, Phase- II MIDC, Dombivali	Industrial		
		SAMP	MIDC Office Domdivali	Dombivali	Industrial	
Kalyan	SAMP	MPCB Ro Kalyan office	Kalyan	Commercial		

RO	Region	Program	Station	Location	Type
	Ulhasnagar	NAMP	Powai Chowk	Octroi Naka	Rural & other areas
			Smt. Chandibai Himmatlal Mansukhani College Campus	CHM College Ulhasnagar	Rural & other areas
Kolhapur	Chiplun	NAMP	MIDC Chalkewadi	MIDC Chalkewadi,Chiplun	Residential
			MIDC Lote	MIDC Water supply Plant Chiplun	Industrial
	Kolhapur	NAMP	Mahadwar Road	Near Mahalaxmi temple ,Kolhapur	Residential
			Ruikar Trust	Ruikar trust, Dhabhokar corner,Kolhapur	Rural & other areas
			Shivaji University	Shivaji University Campus, Vidyanagar, Kolhapur	Residential
	Sangli	NAMP	Krishna Valley school	MIDC Kupwad	Industrial
			Sangli-Miraj Primary Municipal school, Near Bharati Vidyapeeth	Rajawada Chowk, Sangli	Rural & other areas
Terrace of SRO-Sangli, Udyog Bhavan			Vishrambag, Sangli	Residential	
Mumbai	CAAQMS	Bandra	Govt. Polytechnique.Premises Kherwadi	Residential	
			Sion	Sion Hospital	Residential
	NAMP	Neeri office, Worli	Worli	Residential	
Nagpur	NAMP	Civil lines Nagpur	RO Office Nagpur Premises	Residential	
		Hingna Road	MIDC office Hingna Road Nagpur	Industrial	

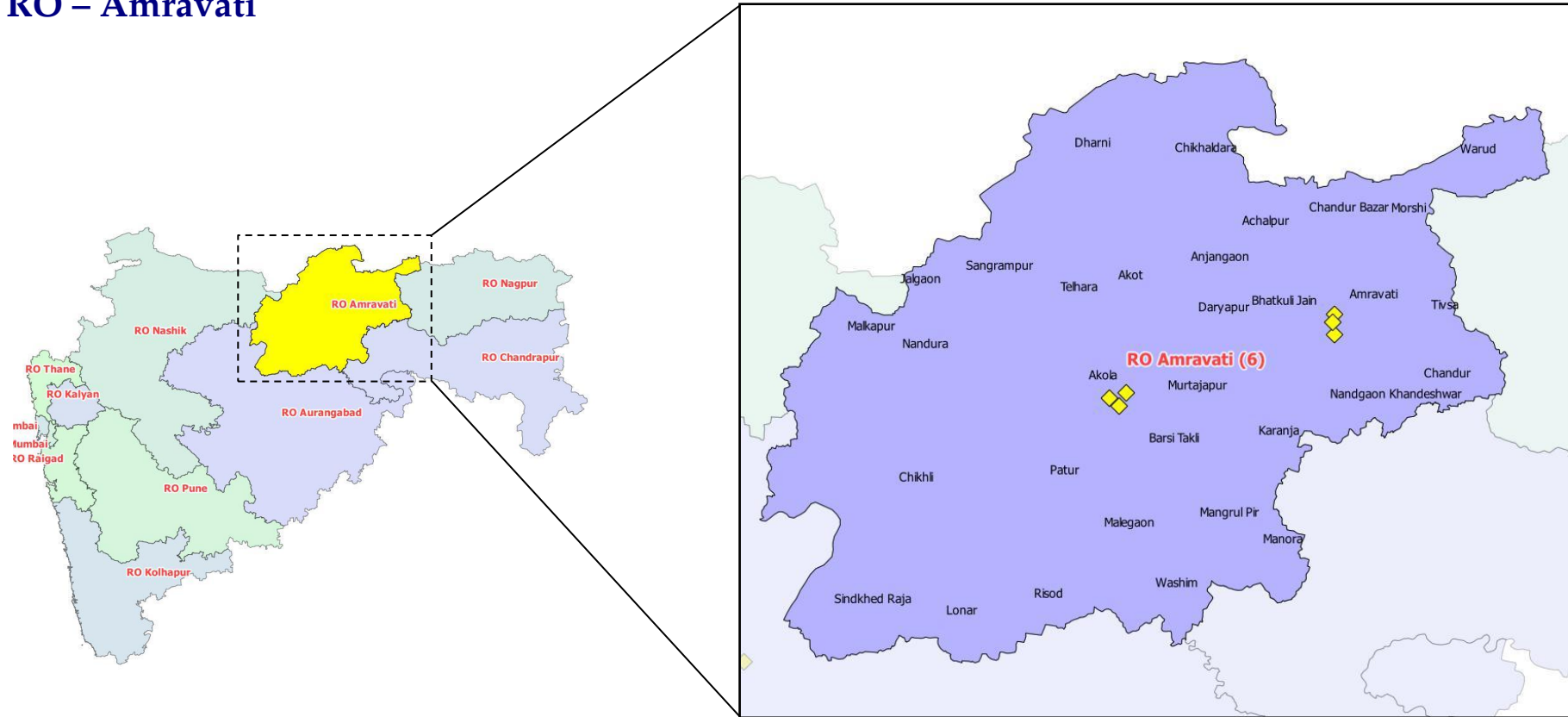
RO	Region	Program	Station	Location	Type	
Nashik			North Ambazani road	Terrace of Institute of Engineering, North Ambazano road	Residential	
			Sadar	Govt. poly technique College , Sadar	Rural & other areas	
	Jalgaon	NAMP	Girna Water Tank	Ramanand Nagar	Residential	
			MIDC Jalgaon	Terrace of MIDC Office	Industrial	
	Nashik	NAMP	Old B. J. Market	Terrace of SRO building	Residential	
			MIDC Satpur	VIP industries ltd ,MIDC satpur, Nashik	Industrial	
			RTO Colony	RTO Colony Water Tank near Golf Club	Residential	
			SRO Office Nashik	Udyog Bhavan	Residential	
	Navi Mumbai	Navi Mumbai	CAAQMS	Airoli	Airoli fire station	Rural & other areas
				Vashi	Fire Brigade compound, Vashi.	Residential
		NAMP	MPCB-Nirmal Bhavan, Mahape	Central lab Building, MPCB Navi Mumbai	Industrial	
			Nerul	Dr.D.Y. Patil College Building Nerul	Residential	
			Rabale	T.B.I.A, Rabale	Industrial	
Taloja		NAMP	Kharghar	Nimisha Hospital Sec-12 ,Kharghar	Residential	
	MIDC Taloja		MIDC Common Facility Building	Industrial		
Pune	Pune	CAAQMS	Karve Road - CAAQMS	PMC Zonal office	Residential	

RO	Region	Program	Station	Location	Type
Raigad		NAMP	Bhosari	Maratha Chamber of commerce Building terrace	Industrial
			Nal Stop	MSEB Office Nal Stop ,Pune	Rural & other areas
			Pimpri-Chinchwad	Pimpri-Chinchwad Municipal corporation	Residential
			Swarget	Terrace of Swargate police Chowky	Residential
	Solapur	CAAQMS	Solapur	Municipal Corporation Premises	Residential
			Saat Rasta	Saat Rasta Opp. ST Bus stand, Chitale Clinic Solapur	Residential
			WIT Campus	WIT Campus Ashok Chawk ,Solapur	Residential
	Panvel	NAMP	Panvel Water Supply	Panvel Water Supply Behind ST Stand	Residential
Thane	NAMP	Kolshet	M/s Clariant (chemical unit)Kolshet Thane	Industrial	
		Kopri	Old Thane Maternity Hospital , Kopri, Thane	Residential	
		Naupada	Thane M.C. Regional Office Naupada ,Shahu Market , Thane	Rural & other areas	

Annex – II: Data for AAQMS in Maharashtra - 2011-12



RO – Amravati



Region	Program	Station No	Station	Frequency	Latitude	Longitude
Amravati	NAMP	549	Godhadiwala Private Limited	Two Days In A Week	20° 53.349'	77° 45.534'
		548	Govt. College of Engineering	Two Days In A Week	20° 57.247'	77° 45.588'
		547	Raj Kamal Chowk	Two Days In A Week	20° 55.707'	77° 45.236'
Akola	NAMP	702	Akola- College of Engg & Technology	Two Days In A Week	20° 42.277'	77° 5.599'
		700	LRT Commerce College	Two Day In a Week	20° 41.0197'	77° 2.7254'
		701	MIDC Water Works	Two Days In A Week	20° 41.202'	77° 2.335'

Akola - College of Eng. and Technology Akola (Architecture Branch)

Table No 18: Data for monthly average reading recorded at College of Eng. And Technology Akola (Architecture Branch) - Akola

FY	N	Monthly average ($\mu\text{g}/\text{m}^3$)		
		SO ₂	NO _x	RSPM
2011-12				
Apr	9	10	12	172
May	-	-	-	-
Jun	6	9	10	142
Jul	8	8	10	118
Aug	6	7	3	116
Sep	9	7	10	136
Oct	9	8	9	156
Nov	8	9	11	167
Dec	9	10	12	170
Jan	10	7	2	121
Feb	8	10	12	166
Mar	10	10	12	174
	Total N		% of exceedence	
	92	0.0	0.0	95.7

Table No 19: Data for annual average trend of SO₂, NO_x and RSPM at College of Eng. and Technology Akola (Architecture Branch) - Akola

Year	N	Annual average ($\mu\text{g}/\text{m}^3$)		
		SO ₂	NO _x	RSPM
Annual Standards		50	40	60
04-05	-	-	-	-
05-06	-	-	-	-
06-07	-	-	-	-
07-08	-	-	-	-
08-09	-	-	-	-
09-10	26	6	2	117
10-11	74	7	5	142
11-12	92	9	9	150

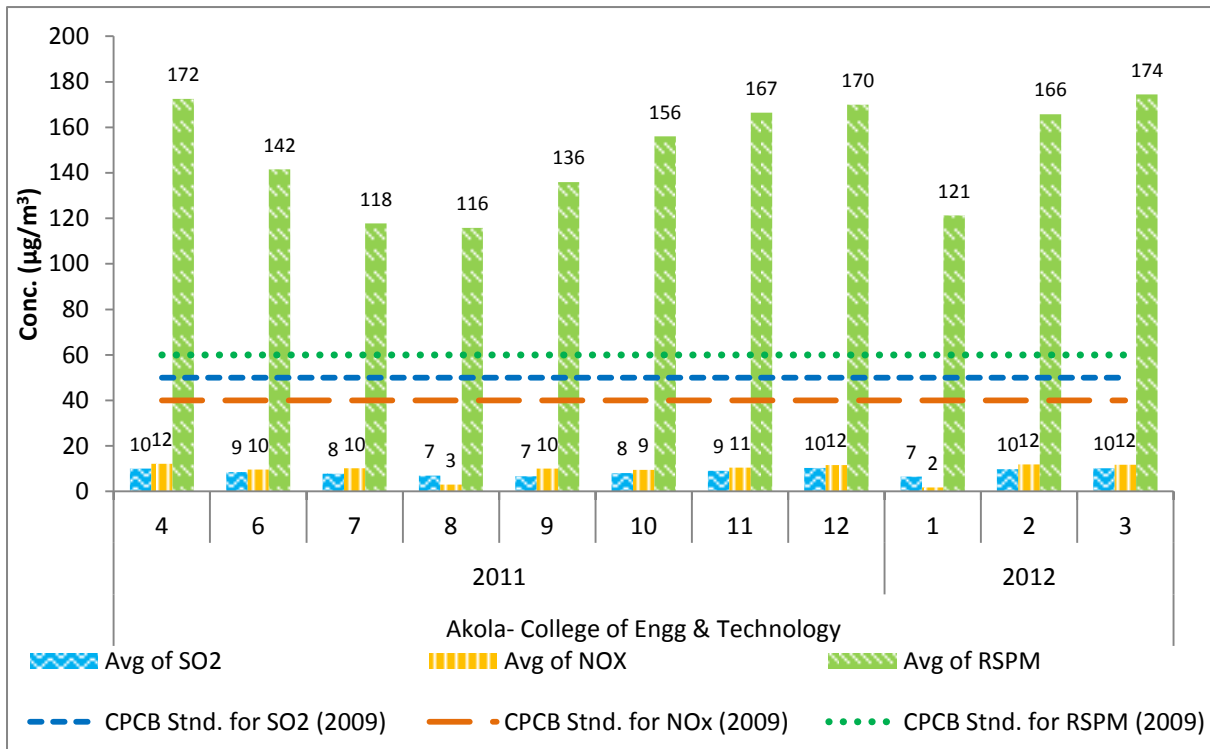


Figure No 21: Monthly average reading recorded at College of Eng. And Technology Akola (Architecture Branch) – Akola

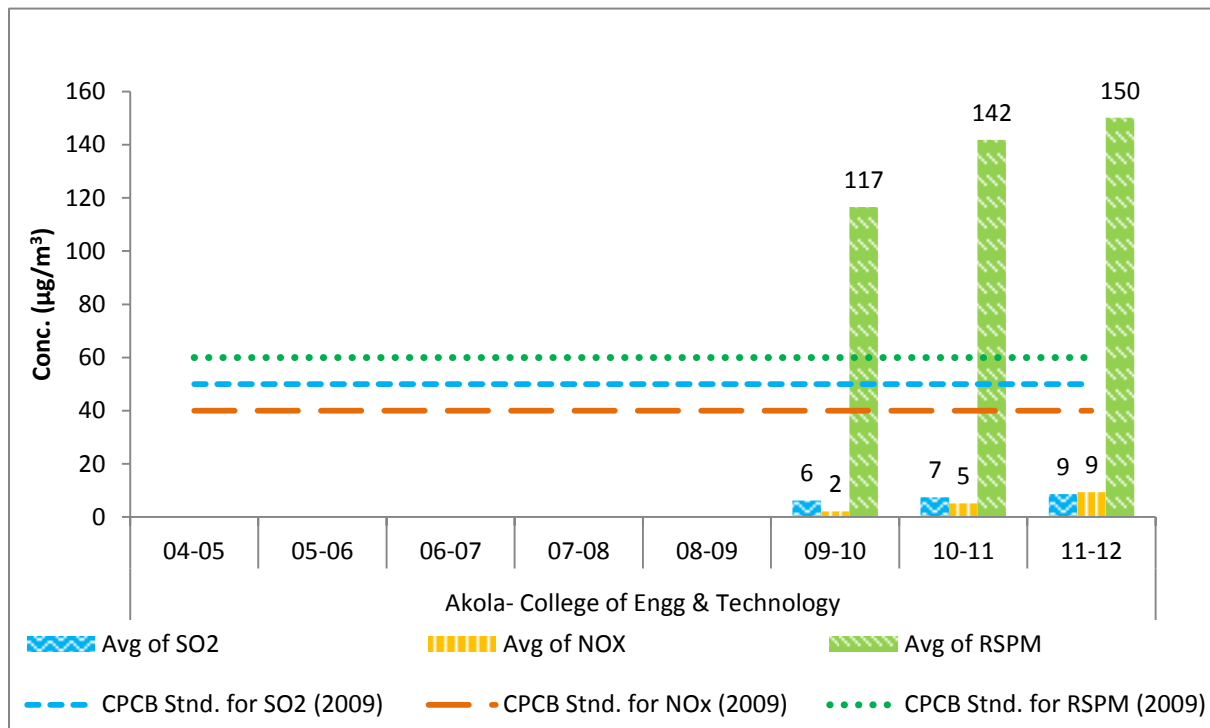


Figure No 22: Annual average trend of SO₂, NO_x and RSPM at College of Eng. And Technology Akola (Architecture Branch) – Akola

Akola - LRT Commerce College

Table No 20: Data for monthly average reading recorded at LRT Commerce College. - Akola

FY	N	Monthly average ($\mu\text{g}/\text{m}^3$)		
		SO ₂	NO _x	RSPM
2011-12				
Apr	8	8	10	129
May	-	-	-	-
Jun	7	6	1	108
Jul	7	5	10	81
Aug	9	6	0	115
Sep	7	6	11	117
Oct	7	7	9	126
Nov	9	7	9	130
Dec	8	8	9	134
Jan	8	9	10	159
Feb	8	7	1	125
Mar	8	7	9	137
	Total N		% of exceedence	
	86	0.0	0.0	90.7

Table No 21: Data for annual average trend of SO₂, NO_x and RSPM at LRT Commerce College. - Akola

Year	N	Annual average ($\mu\text{g}/\text{m}^3$)		
		SO ₂	NO _x	RSPM
<i>Annual Standards</i>		<i>50</i>	<i>40</i>	<i>60</i>
04-05	-	-	-	-
05-06	-	-	-	-
06-07	-	-	-	-
07-08	-	-	-	-
08-09	-	-	-	-
09-10	24	6	2	87
10-11	88	6	3	107
11-12	86	7	7	125

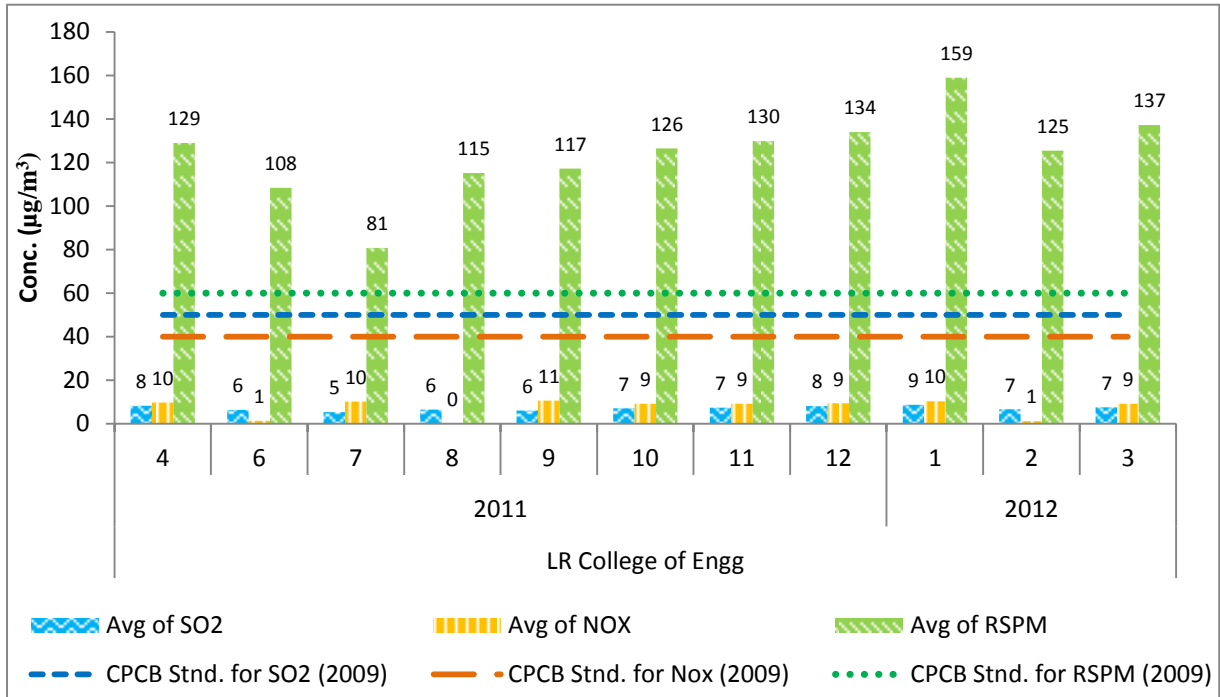


Figure No 23: Monthly average reading recorded at LRT Commerce College. - Akola

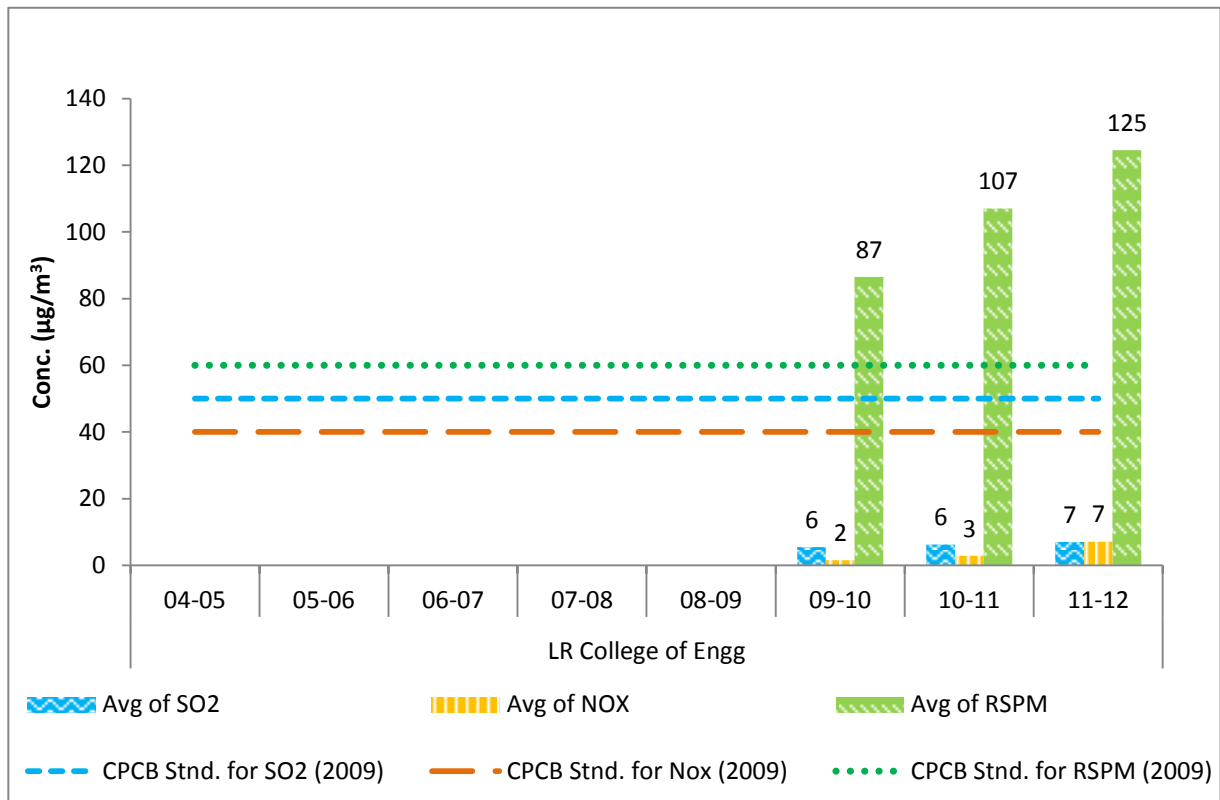


Figure No 24: Annual average trend of SO₂, NO_x and RSPM at LRT Commerce College. - Akola

Akola - MIDC Water Works

Table No 22: Data for monthly average reading recorded at MIDC Water Works - Akola

FY	N	Monthly average ($\mu\text{g}/\text{m}^3$)		
		SO ₂	NO _x	RSPM
2011-12				
Apr	7	12	14	165
May	7	13	15	159
Jun	10	10	12	136
Jul	6	7	10	102
Aug	7	7	5	117
Sep	8	8	10	132
Oct	6	9	10	139
Nov	9	10	11	144
Dec	9	11	13	151
Jan	8	9	11	137
Feb	9	11	12	146
Mar	8	12	13	158
Total N		% of exceedence		
94		0.0	0.0	96.8

Table No 23: Data for annual average trend of SO₂, NO_x and RSPM at MIDC Water Works - Akola

Year	N	Annual average ($\mu\text{g}/\text{m}^3$)		
		SO ₂	NO _x	RSPM
Annual Standards		50	40	60
04-05	-	-	-	-
05-06	-	-	-	-
06-07	-	-	-	-
07-08	-	-	-	-
08-09	-	-	-	-
09-10	1	8	10	88
10-11	84	9	7	131
11-12	94	10	11	141

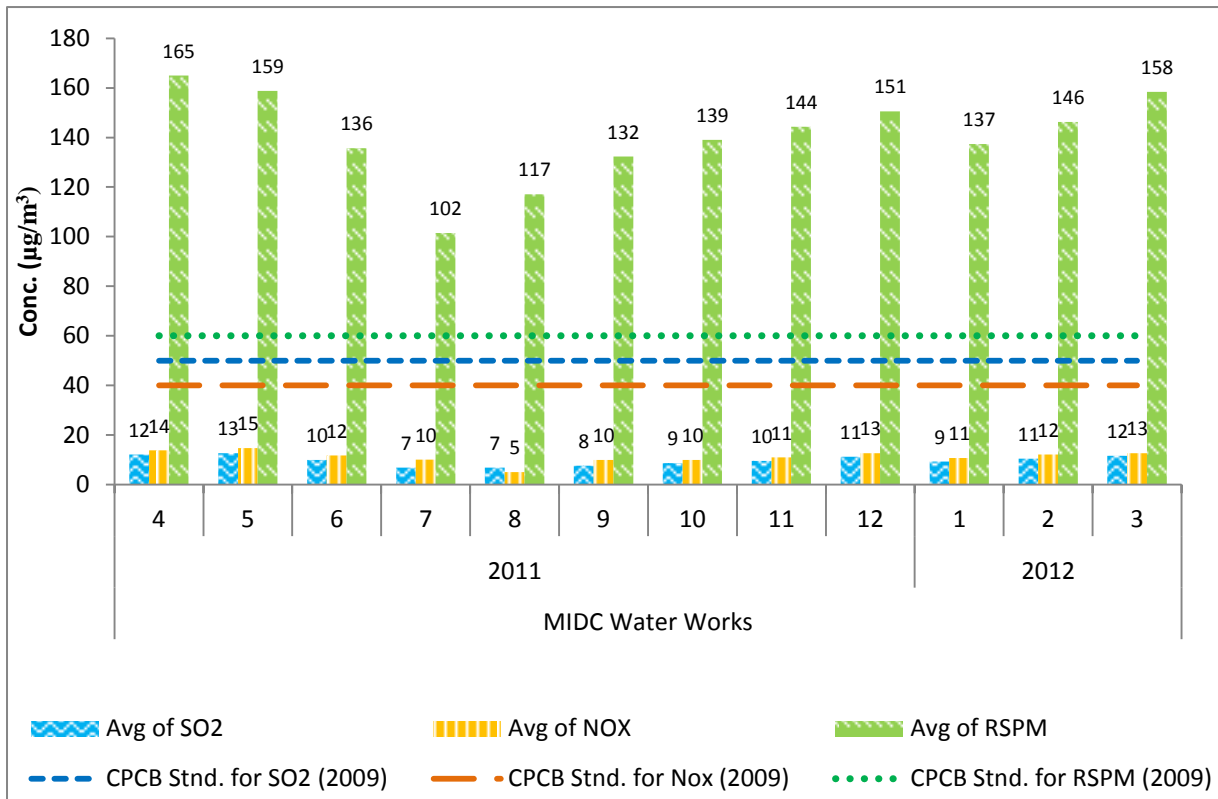


Figure No 25: Monthly average reading recorded at MIDC Water Works - Akola

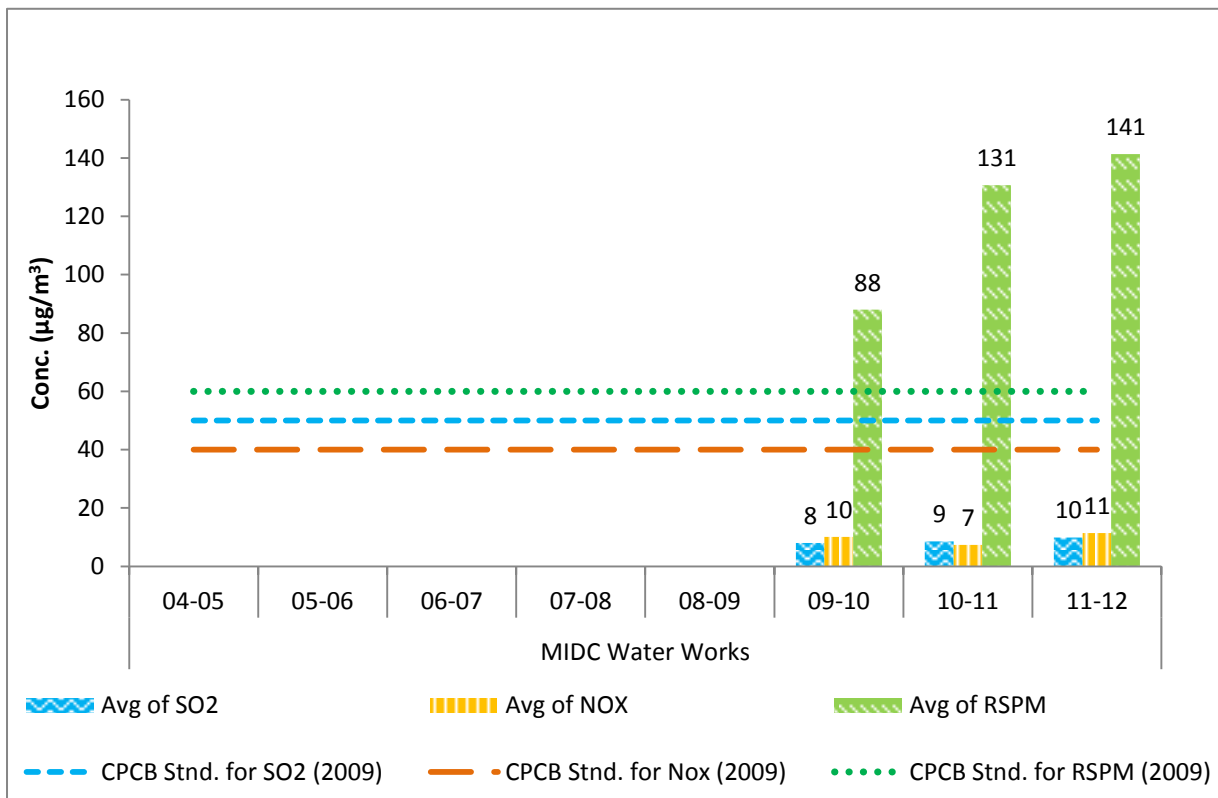


Figure No 26: Annual average trend of SO₂, NO_x and RSPM at MIDC Water Works - Akola

Amravati – Godhadiwala Private Limited

Table No 24: Data for monthly average reading recorded at Godhadiwala Private Limited Amravati

FY	N	Monthly average ($\mu\text{g}/\text{m}^3$)		
		SO ₂	NO _x	RSPM
2011-12				
Apr	6	14	17	139
May	6	14	15	116
Jun	7	11	13	93
Jul	7	10	12	102
Aug	10	10	12	82
Sep	9	10	12	81
Oct	9	11	12	95
Nov	9	10	12	99
Dec	9	10	12	95
Jan	9	12	13	98
Feb	8	12	14	101
Mar	9	12	14	114
Total N			% of exceedence	
	98	0.0	0.0	44.9

Table No 25: Data for annual average trend of SO₂, NO_x and RSPM at Godhadiwala Private Limited Amravati

Year	N	Annual average ($\mu\text{g}/\text{m}^3$)		
		SO ₂	NO _x	RSPM
Annual Standards		50	40	60
62				
04-05	-	-	-	-
05-06	-	-	-	-
06-07	40	12	16	67
07-08	98	9	12	58
08-09	98	10	13	71
09-10	103	12	14	102
10-11	84	12	14	125
11-12	98	11	13	100

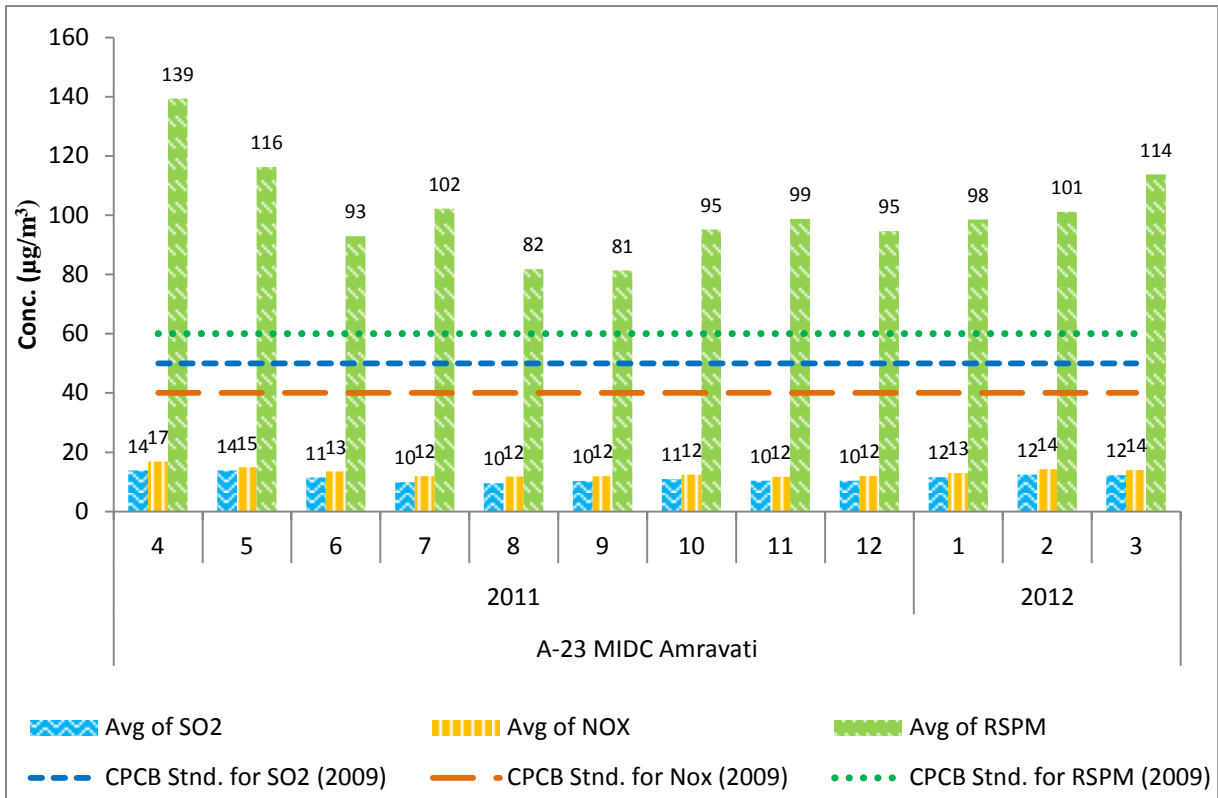


Figure No 27: Monthly average reading recorded at Godhadiwala Private Limited Amravati

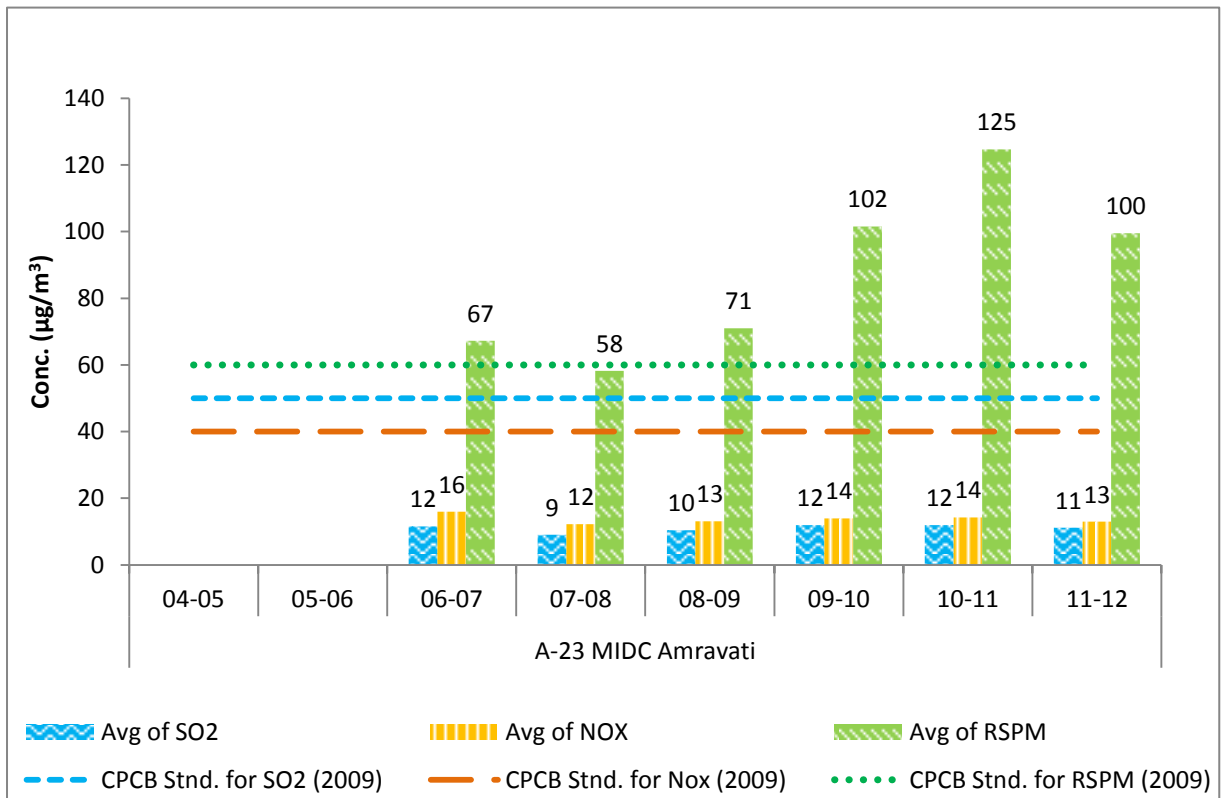


Figure No 28: Annual average trend of SO₂, NO_x and RSPM at Godhadiwala Private Limited Amravati

Amravati – Govt. College of Engineering

Table No 26: Data for monthly average reading recorded at Govt. College of Engineering - Amravati

FY	N	Monthly average ($\mu\text{g}/\text{m}^3$)		
		SO ₂	NO _x	RSPM
2011-12				
Apr	7	11	13	89
May	8	11	13	95
Jun	8	10	12	81
Jul	7	10	12	70
Aug	8	10	12	61
Sep	8	10	12	77
Oct	9	10	12	73
Nov	8	9	12	65
Dec	9	11	13	83
Jan	8	11	13	76
Feb	8	11	13	85
Mar	7	11	13	94
	Total N		% of exceedence	
	95	0.0	0.0	6.3

Table No 27: Data for annual average trend of SO₂, NO_x and RSPM at Govt. College of Engineering – Amravati

Year	N	Annual average ($\mu\text{g}/\text{m}^3$)		
		SO ₂	NO _x	RSPM
Annual Standards		50	40	60
04-05	-	-	-	-
05-06	-	-	-	-
06-07	38	10	12	50
07-08	98	8	8	40
08-09	99	8	10	47
09-10	104	10	12	78
10-11	101	10	13	79
11-12	95	10	12	79

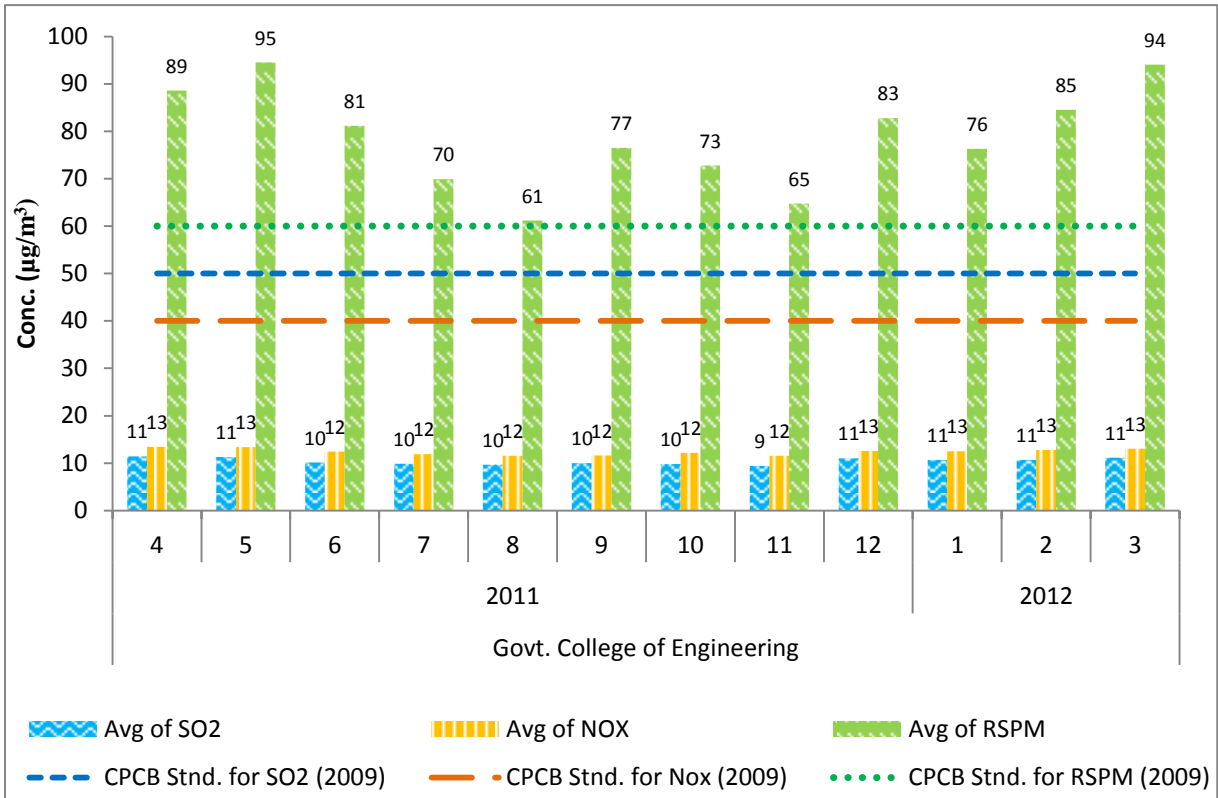


Figure No 29: Monthly average reading recorded at Govt. College of Engineering - Amravati

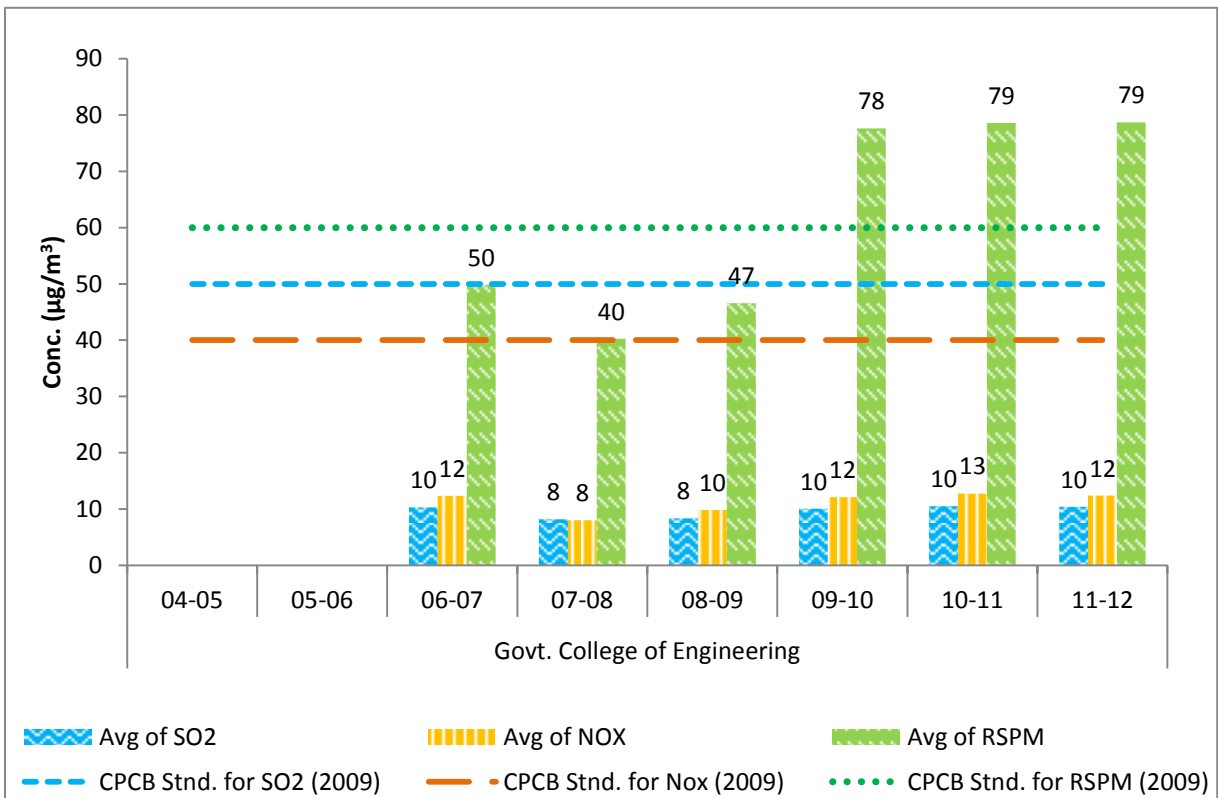


Figure No 30: Annual average trend of SO₂, NO_x and RSPM at Govt. College of Engineering – Amravati

Amravati – Raja Kamal Chowk

Table No 28: Data for monthly average reading recorded at Raja Kamal Chowk, Amravati

FY	N	Monthly average ($\mu\text{g}/\text{m}^3$)		
		SO ₂	NO _x	RSPM
2011-12				
Apr	7	13	16	128
May	7	13	16	151
Jun	16	29	40	78
Jul	7	11	13	103
Aug	8	11	12	86
Sep	7	11	13	107
Oct	9	12	14	88
Nov	9	12	13	109
Dec	9	12	14	106
Jan	8	12	14	111
Feb	6	13	15	128
Mar	9	13	14	139
Total N			% of exceedence	
102		0.0	0.0	68.6

Table No 29: Data for annual average trend of SO₂, NO_x and RSPM at Raja Kamal Chowk, Amravati

Year	N	Annual average ($\mu\text{g}/\text{m}^3$)		
		SO ₂	NO _x	RSPM
Annual Standards		50	40	60
04-05	-	-	-	-
05-06	-	-	-	-
06-07	43	13	19	79
07-08	94	11	16	78
08-09	98	12	15	100
09-10	104	14	16	125
10-11	104	13	15	146
11-12	102	15	18	108

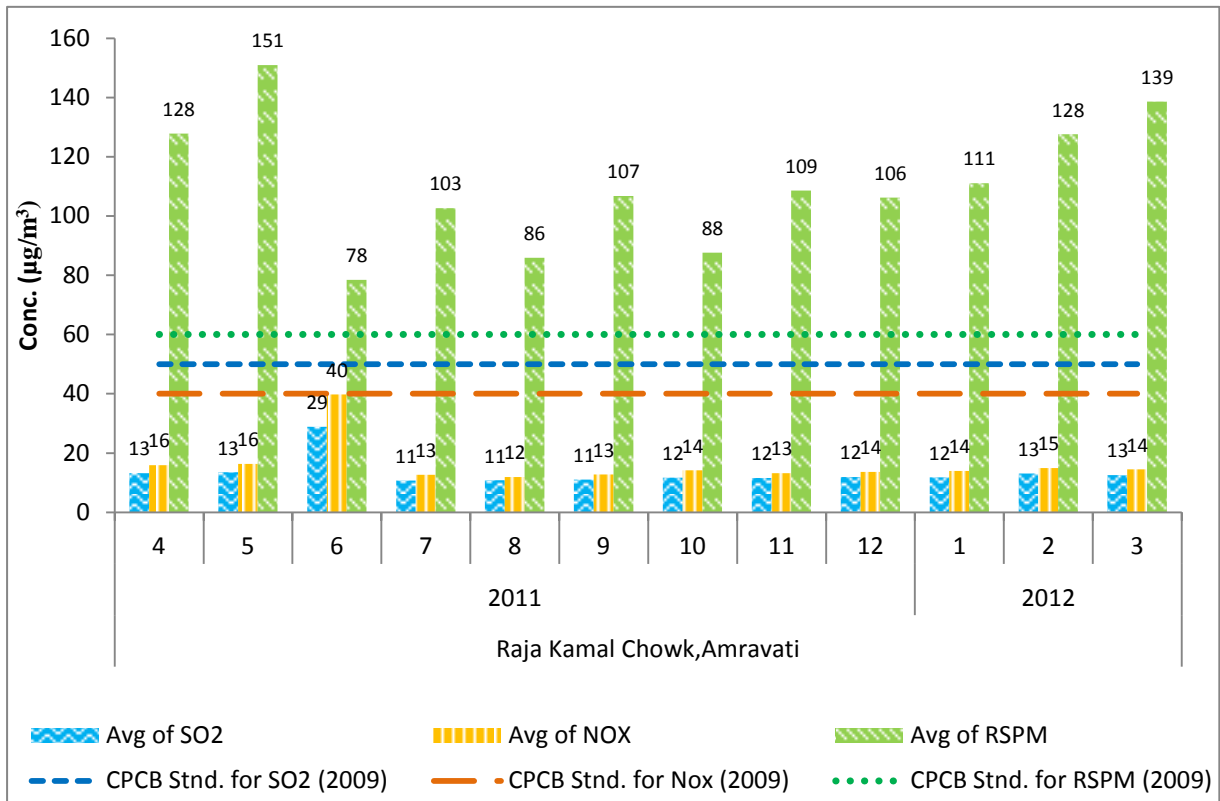


Figure No 31: Monthly average reading recorded at Raja Kamal Chowk, Amravati

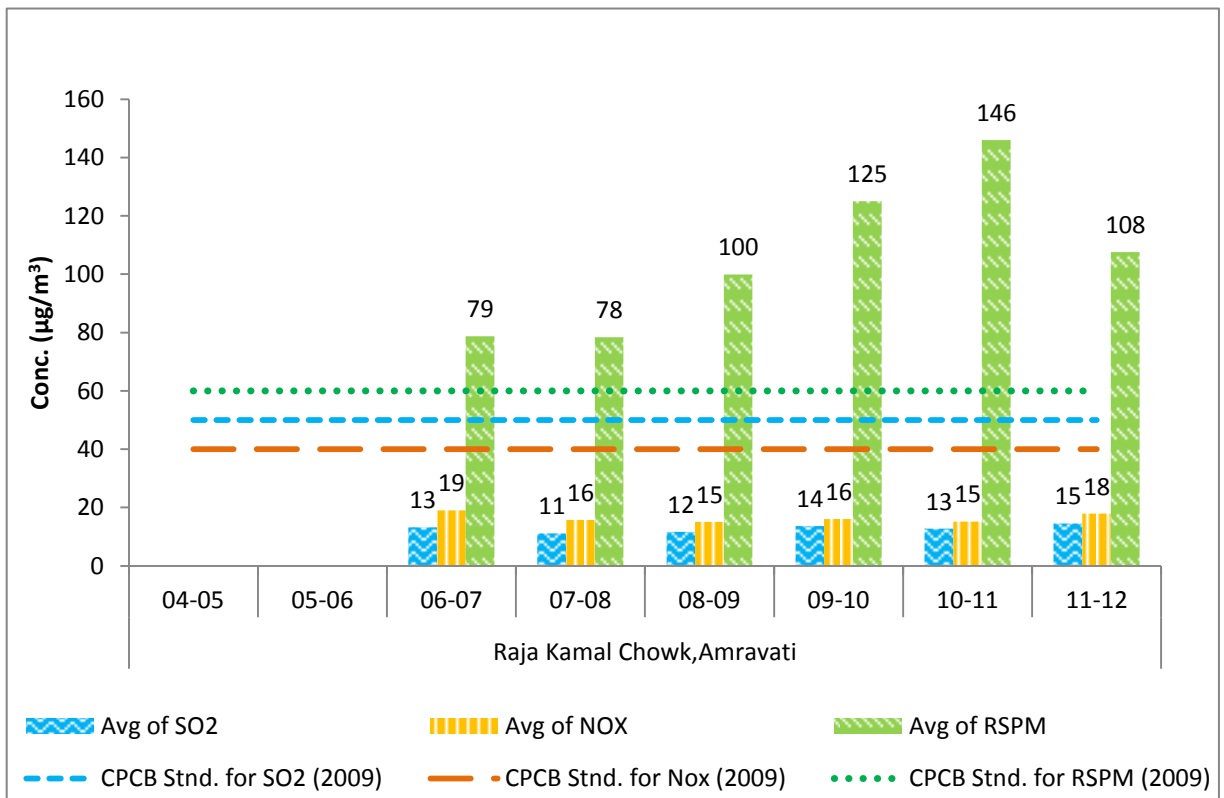
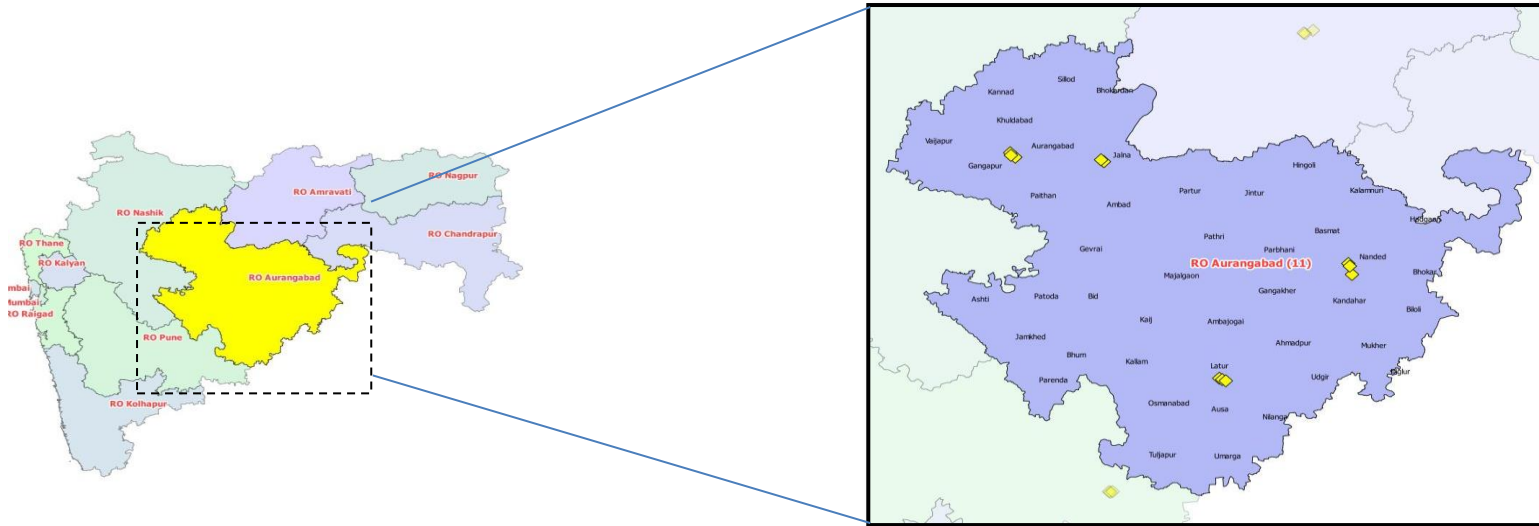


Figure No 32: Annual average trend of SO₂, NO_x and RSPM at Raja Kamal Chowk, Amravati

RO – Aurangabad



Region	Program	Station Codes	Station	Frequency	Latitude	Longitude
Aurangabad	NAMP	513	C.A.D.A. Office	Two Days In A Week	19° 52.238'	75° 21.058'
		512	Collector Office, Aurangabad	Two Days In A Week	19° 53.973'	75° 19.236'
		511	SBES College	Two Days In A Week	19° 52.915'	75° 19.561'
Jalna	NAMP	706	Jalna- Bachat Bhavan	Two Days In A Week	19° 50.440'	75° 52.290'
		707	Jalna- Krishna Dhan	Two Days In A Week	19° 51.071'	75° 51.240'
Latur	NAMP	641	MIDC Water Works	Twice a week	18° 24.884'	76° 32.824'
		642	Shyam Nagar-Kshewraj Vidyalaya	Twice a week	18° 24.360'	76° 33.836'
		643	Ganj Golai - Sidhleshwar Bank	Twice a week	18° 23.966'	76° 35.044'
Nanded	NAMP	703	Ganeshnagar	Two Days In A Week	19° 10.272'	77° 17.939'
		705	Industrial Area CIDCO	Two Days In A Week	19° 5.803'	77° 19.298'
		704	Mutha Chowk	Two Days In A Week	19° 9.281'	77° 18.582'

Aurangabad - C.A.D.A. Office

Table No 30: Data for monthly average reading recorded at C.A.D.A. Office - Aurangabad

FY	N	Monthly average ($\mu\text{g}/\text{m}^3$)		
		SO ₂	NO _x	RSPM
2011-12				
Apr	8	9	31	79
May	8	14	40	114
Jun	9	8	23	76
Jul	8	7	27	37
Aug	9	7	26	31
Sep	9	7	29	39
Oct	8	10	42	77
Nov	9	10	34	81
Dec	9	12	46	100
Jan	8	12	42	81
Feb	9	11	39	90
Mar	9	11	33	101
Total N		% of exceedence		
103		0.0	0.0	22.3

Table No 31: Data for annual average trend of SO₂, NO_x and RSPM at C.A.D.A. Office - Aurangabad

Year	N	Annual average ($\mu\text{g}/\text{m}^3$)		
		SO ₂	NO _x	RSPM
Annual Standards		50	40	60
04-05	-	-	-	-
05-06	32	7	23	119
06-07	90	5	19	79
07-08	98	5	23	79
08-09	102	9	21	63
09-10	99	6	22	66
10-11	102	6	22	69
11-12	103	10	34	75

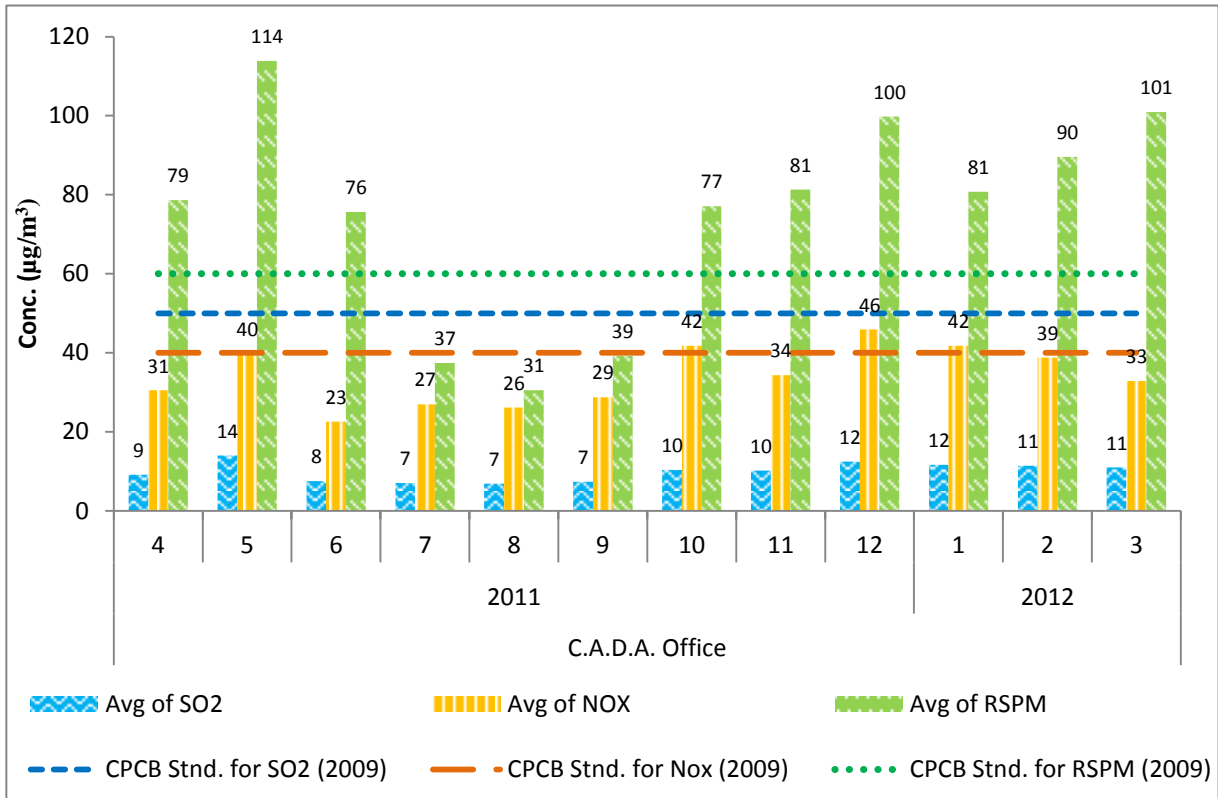


Figure No 33: Monthly average reading recorded at C.A.D.A. Office - Aurangabad

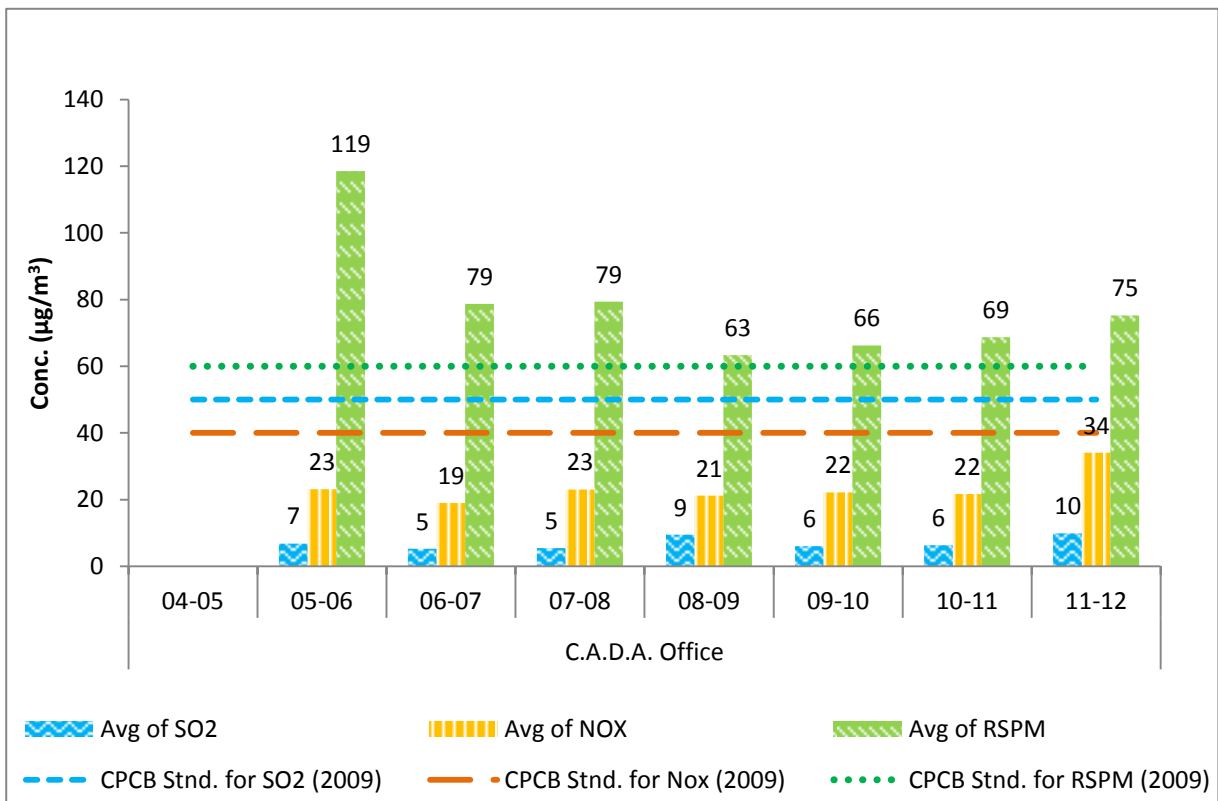


Figure No 34: Annual average trend of SO₂, NO_x and RSPM at C.A.D.A. Office - Aurangabad

Aurangabad - Collector Office

Table No 32: Data for monthly average reading recorded at Collector Office, Aurangabad

FY	N	Monthly average ($\mu\text{g}/\text{m}^3$)		
		SO ₂	NO _x	RSPM
2011-12				
Apr	8	9	26	105
May	10	8	30	230
Jun	8	7	22	78
Jul	8	7	25	60
Aug	10	7	26	45
Sep	8	6	24	58
Oct	9	7	29	69
Nov	9	8	30	73
Dec	8	10	36	93
Jan	10	11	38	85
Feb	8	10	33	94
Mar	8	9	28	95
Total N			% of exceedence	
104		0.0	0.0	19.2

Table No 33: Data for annual average trend of SO₂, NO_x and RSPM at Collector Office, Aurangabad

Year	N	Annual average ($\mu\text{g}/\text{m}^3$)		
		SO ₂	NO _x	RSPM
Annual Standards		50	40	60
04-05	-	-	-	-
05-06	34	6	19	108
06-07	87	4	13	73
07-08	100	5	16	56
08-09	96	8	20	68
09-10	101	6	22	85
10-11	100	6	22	69
11-12	104	8	29	92

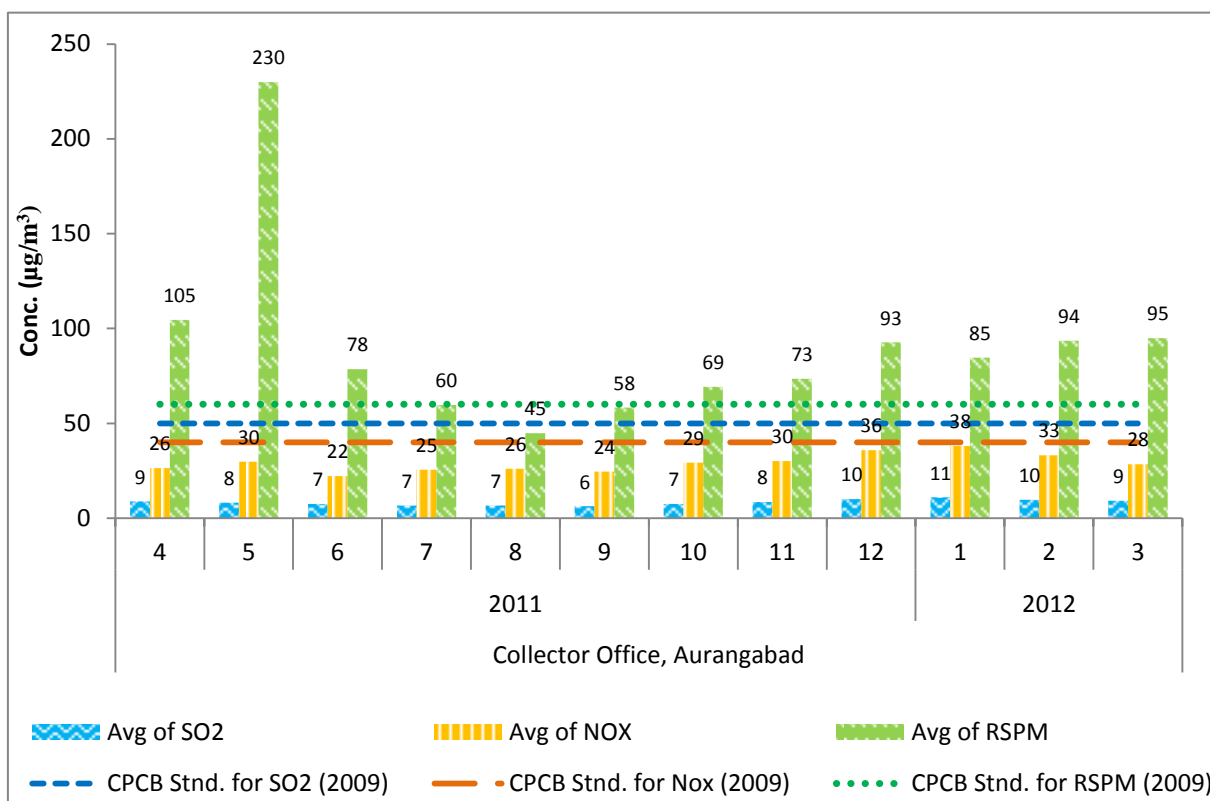


Figure No 35: Monthly average reading recorded at Collector Office, Aurangabad

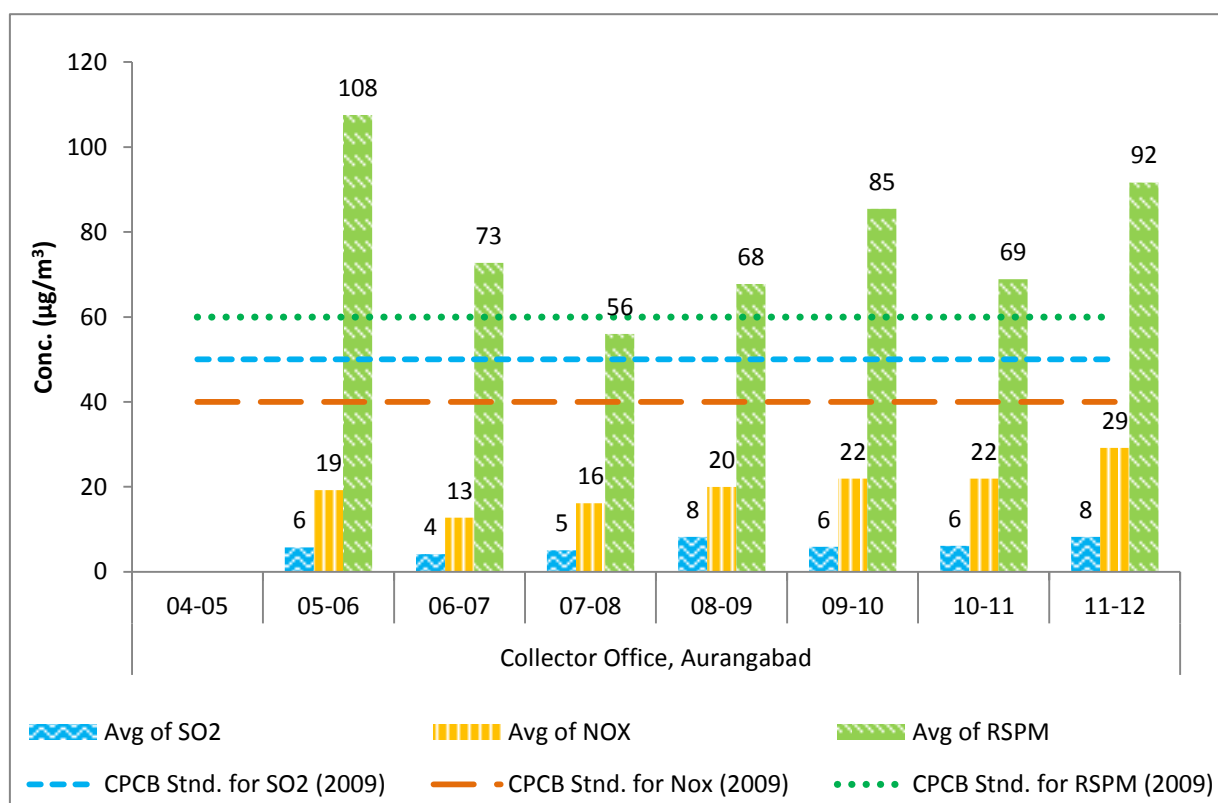


Figure No 36: Annual average trend of SO₂, NO_x and RSPM at Collector Office, Aurangabad

Aurangabad - SBES College

Table No 34: Data for monthly average reading recorded at SBES College – Aurangabad

FY	N	Monthly average ($\mu\text{g}/\text{m}^3$)		
		SO ₂	NO _x	RSPM
2011-12				
Apr	10	10	32	103
May	7	9	30	99
Jun	8	8	23	81
Jul	10	7	28	71
Aug	8	7	28	53
Sep	9	8	32	68
Oct	9	9	37	96
Nov	8	11	34	91
Dec	10	12	40	99
Jan	8	12	43	104
Feb	8	10	35	109
Mar	10	10	34	107
	Total N		% of exceedence	
	105	0.0	0.0	38.1

Table No 35: Data for annual average trend of SO₂, NO_x and RSPM at SBES College – Aurangabad

Year	N	Annual average ($\mu\text{g}/\text{m}^3$)		
		SO ₂	NO _x	RSPM
		50	40	60
<i>Annual Standards</i>				
04-05	-	-	-	-
05-06	35	7	30	166
06-07	83	6	18	85
07-08	101	6	22	79
08-09	104	9	22	94
09-10	101	7	25	98
10-11	95	7	23	94
11-12	105	9	33	90

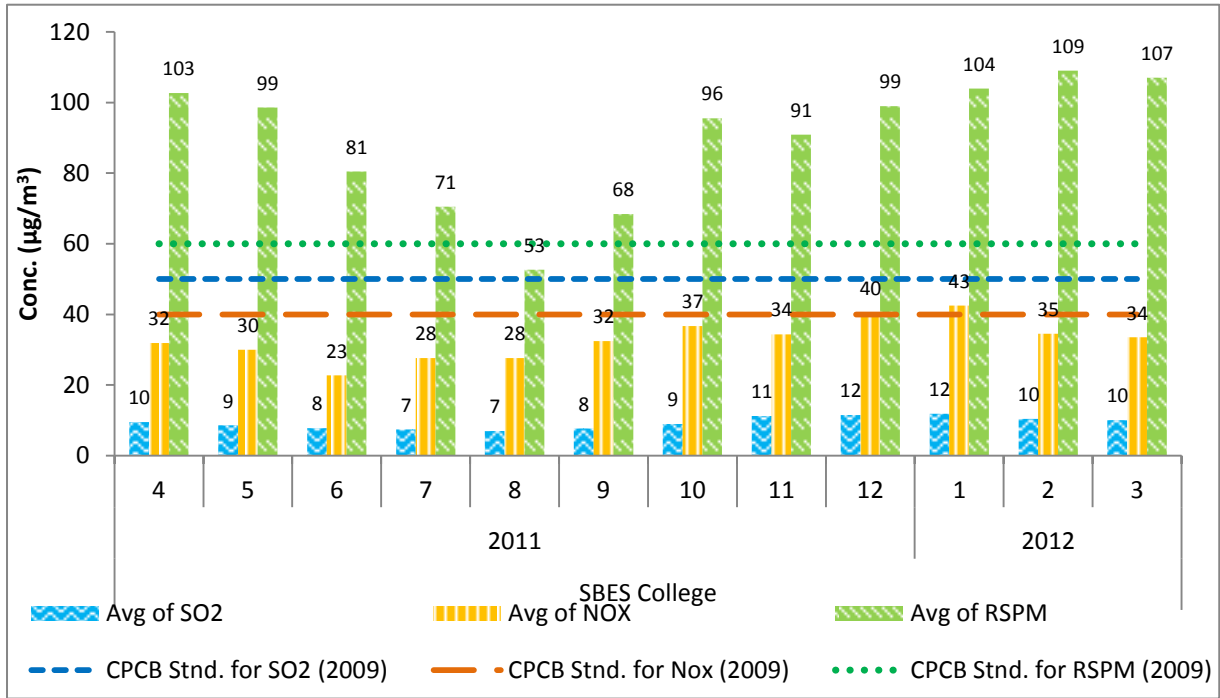


Figure No 37: Monthly average reading recorded at SBES College – Aurangabad

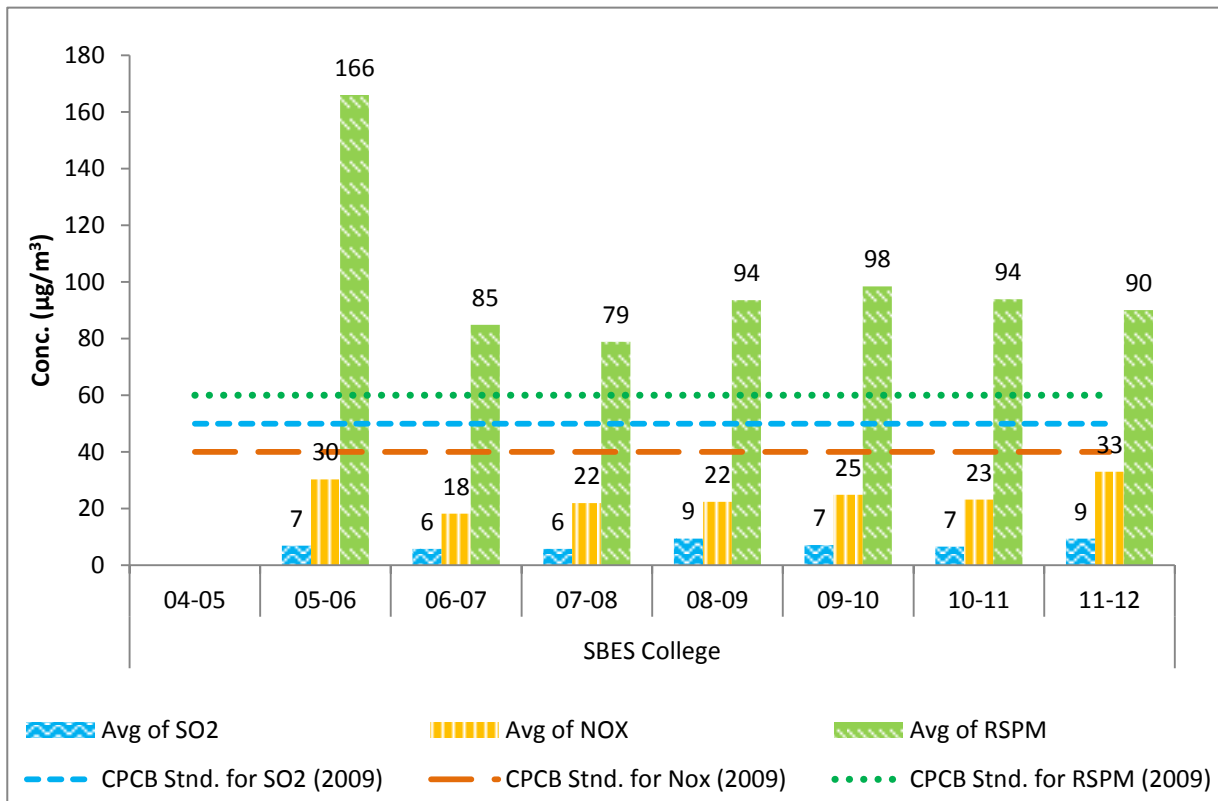


Figure No 38: Annual average trend of SO₂, NO_x and RSPM at SBES College – Aurangabad

Jalna - Bachat Bhavan

Table No 36: Data for monthly average reading recorded at Bachat Bhavan– Jalna

FY	N	Monthly average ($\mu\text{g}/\text{m}^3$)		
		SO ₂	NO _x	RSPM
2011-12				
Apr	9	6	26	108
May	8	5	22	106
Jun	8	5	28	68
Jul	9	5	19	52
Aug	8	6	23	53
Sep	10	6	21	48
Oct	8	7	27	81
Nov	8	7	26	100
Dec	10	8	27	115
Jan	8	9	29	122
Feb	8	7	26	100
Mar	10	6	24	120
	Total N		% of exceedence	
	104	0.0	0.0	41.3

Table No 37: Data for annual average trend of SO₂, NO_x and RSPM at Bachat Bhavan– Jalna

Year	N	Annual average ($\mu\text{g}/\text{m}^3$)		
		SO ₂	NO _x	RSPM
<i>Annual Standards</i>		<i>50</i>	<i>40</i>	<i>60</i>
04-05	-	-	-	-
05-06	-	-	-	-
06-07	100	13	22	53
07-08	95	17	28	87
08-09	18	17	32	66
09-10	32	5	28	84
10-11	102	5	26	73
11-12	104	6	25	89

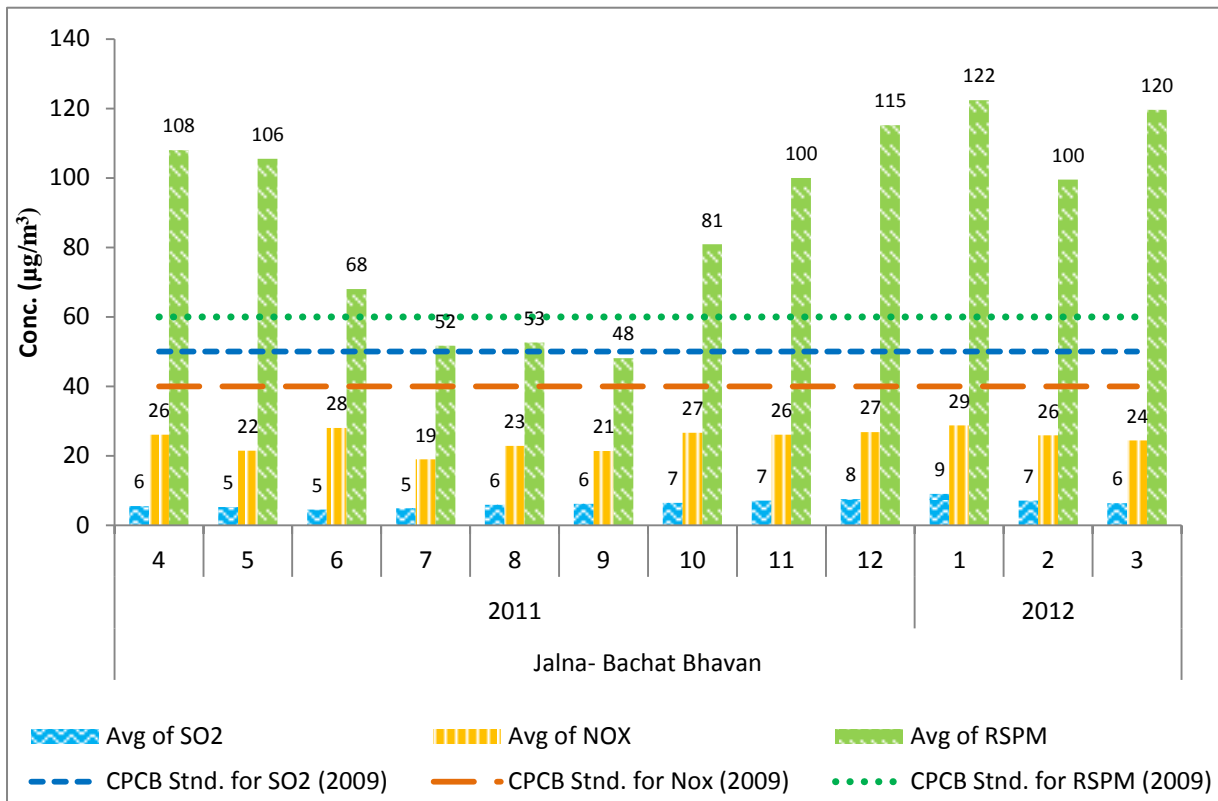


Figure No 39: Monthly average reading recorded at Bachat Bhavan– Jalna

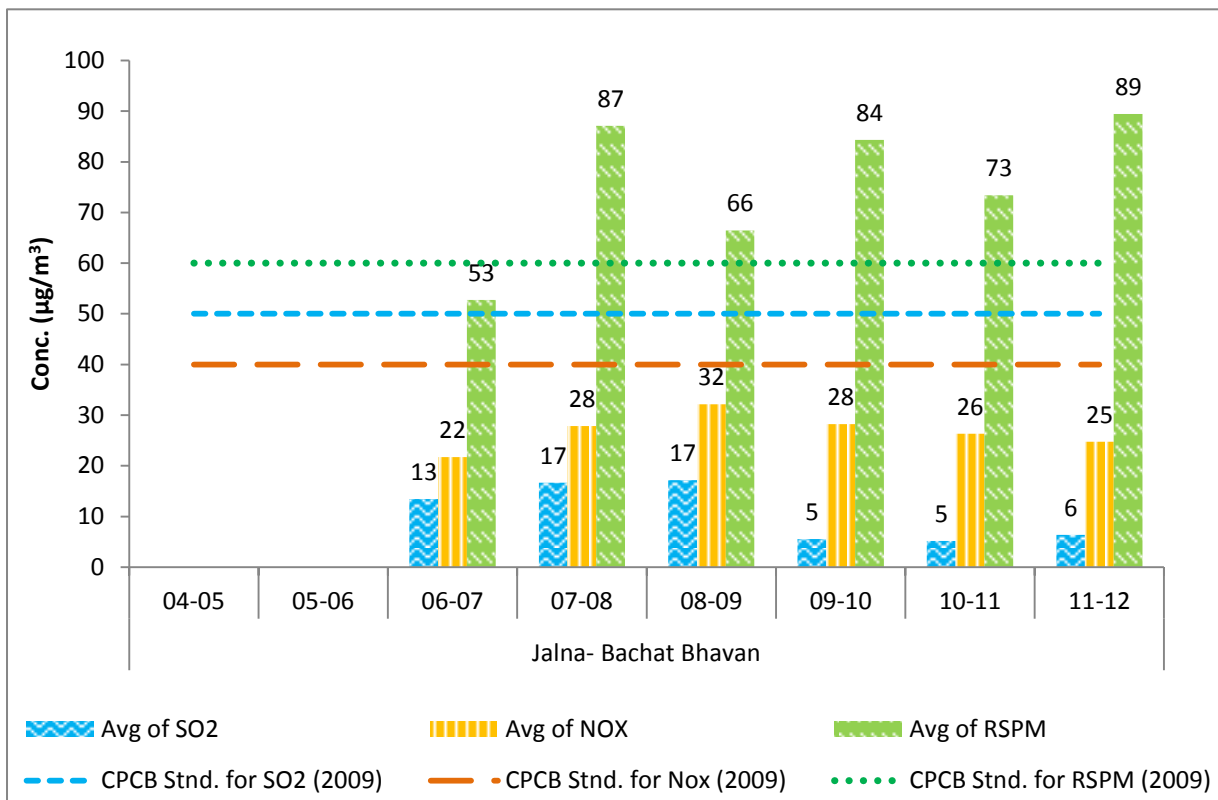


Figure No 40: Annual average trend of SO₂, NO_x and RSPM at Bachat Bhavan– Jalna

Jalna - Krishna Dhan

Table No 38: Data for monthly average reading recorded at Krishna Dhan – Jalna

FY	N	Monthly average ($\mu\text{g}/\text{m}^3$)		
		SO ₂	NO _x	RSPM
2011-12				
Apr	8	7	28	138
May	9	6	24	105
Jun	9	9	26	149
Jul	8	6	21	135
Aug	10	8	25	167
Sep	8	7	24	88
Oct	8	7	28	175
Nov	10	9	28	166
Dec	8	9	29	215
Jan	9	10	30	130
Feb	9	8	28	99
Mar	8	8	27	111
	Total N		% of exceedence	
	104	0.0	0.0	72.1

Table No 39: Data for annual average trend of SO₂, NO_x and RSPM at Krishna Dhan – Jalna

Year	N	Annual average ($\mu\text{g}/\text{m}^3$)		
		SO ₂	NO _x	RSPM
		50	40	60
<i>Annual Standards</i>				
04-05	-	-	-	-
05-06	-	-	-	-
06-07	90	17	29	125
07-08	103	28	44	140
08-09	16	30	45	182
09-10	52	13	37	111
10-11	83	7	33	139
11-12	104	8	26	140

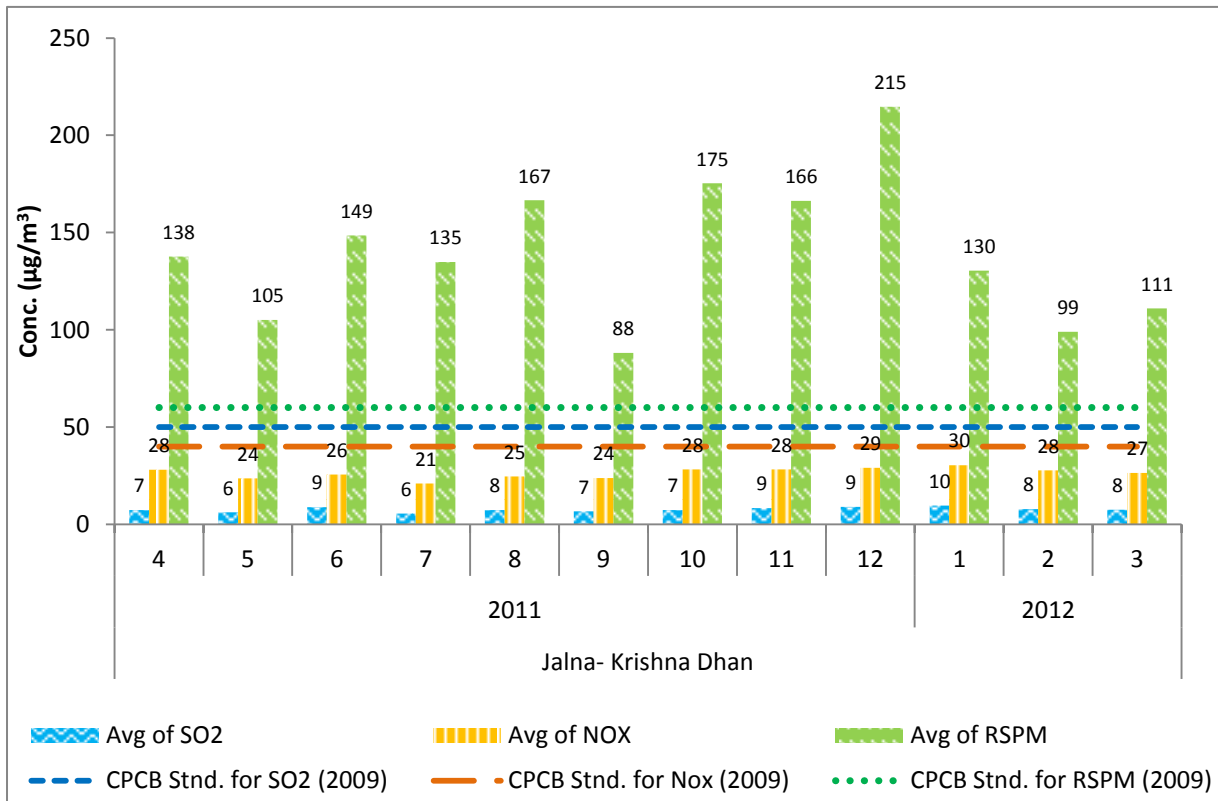


Figure No 41: Monthly average reading recorded at Krishna Dhan – Jalna

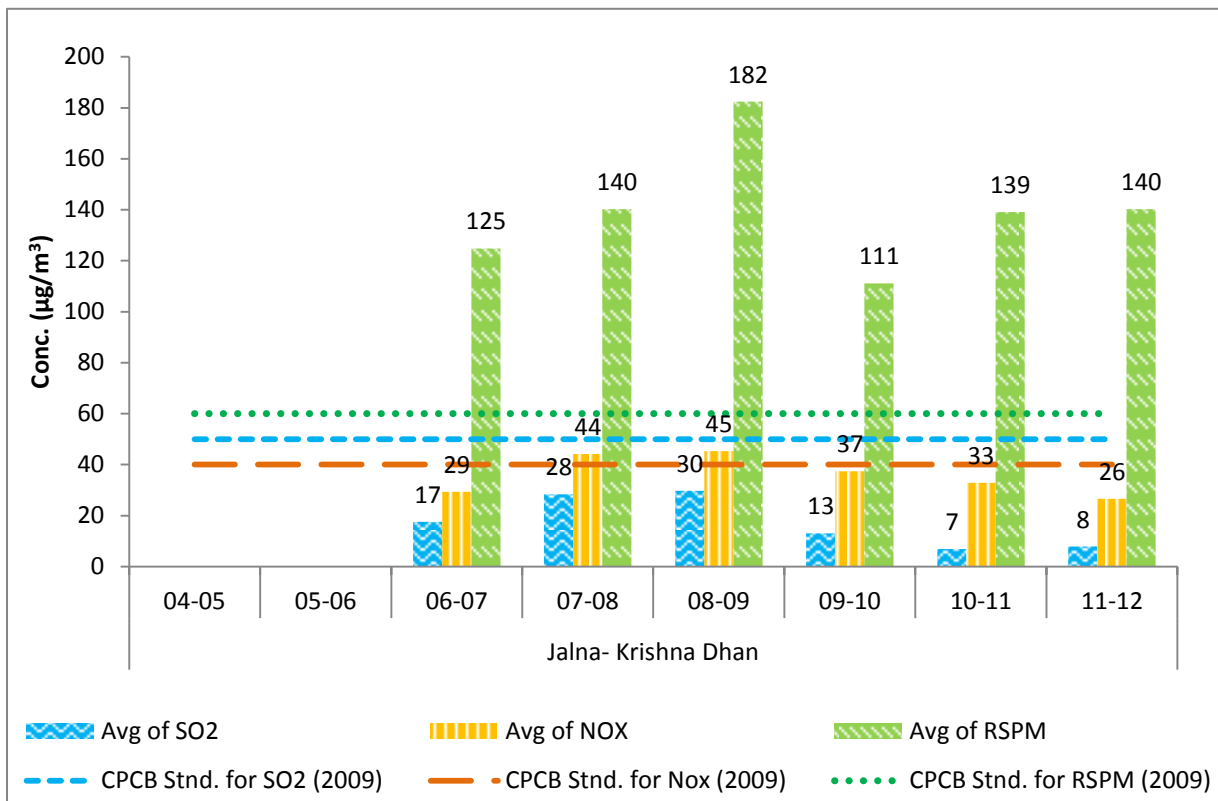


Figure No 42: Annual average trend of SO₂, NO_x and RSPM at Krishna Dhan – Jalna

Latur - MIDC Water Works

Table No 40: Data for monthly average reading recorded at MIDC Water Works – Latur

FY	N	Monthly average ($\mu\text{g}/\text{m}^3$)		
		SO ₂	NO _x	RSPM
2011-12				
Apr	9	7	18	84
May	16	6	16	97
Jun	8	6	11	71
Jul	10	5	13	50
Aug	8	5	14	41
Sep	8	6	11	22
Oct	8	6	15	119
Nov	8	5	15	102
Dec	18	5	15	109
Jan	8	5	18	153
Feb	8	7	24	163
Mar	10	8	18	163
Total N			% of exceedence	
119		0.0	0.0	45.4

Table No 41: Data for annual average trend of SO₂, NO_x and RSPM at MIDC Water Works – Latur

Year	N	Annual average ($\mu\text{g}/\text{m}^3$)		
		SO ₂	NO _x	RSPM
<i>Annual Standards</i>		<i>50</i>	<i>40</i>	<i>60</i>
04-05	-	-	-	-
05-06	-	-	-	-
06-07	-	-	-	-
07-08	-	-	-	-
08-09	91	4	22	77
09-10	99	7	22	76
10-11	100	6	15	95
11-12	119	6	16	99

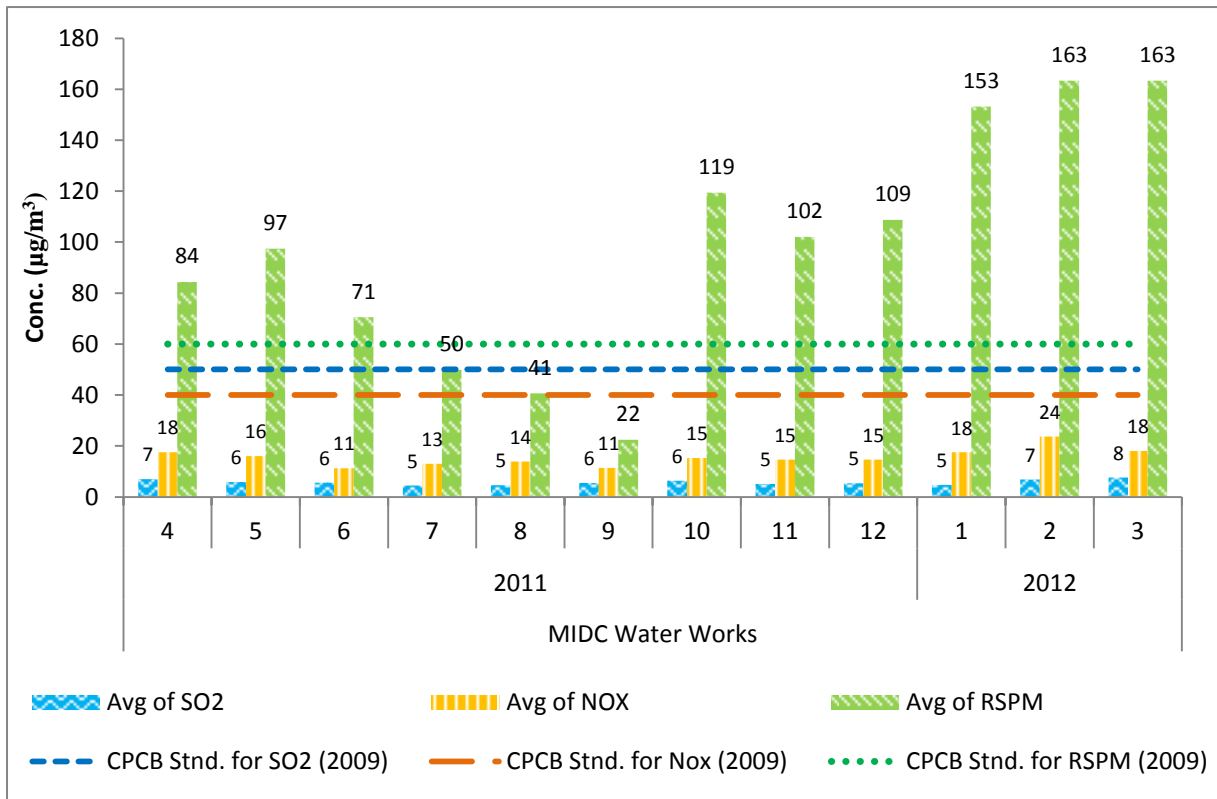


Figure No 43: Monthly average reading recorded at MIDC Water Works – Latur

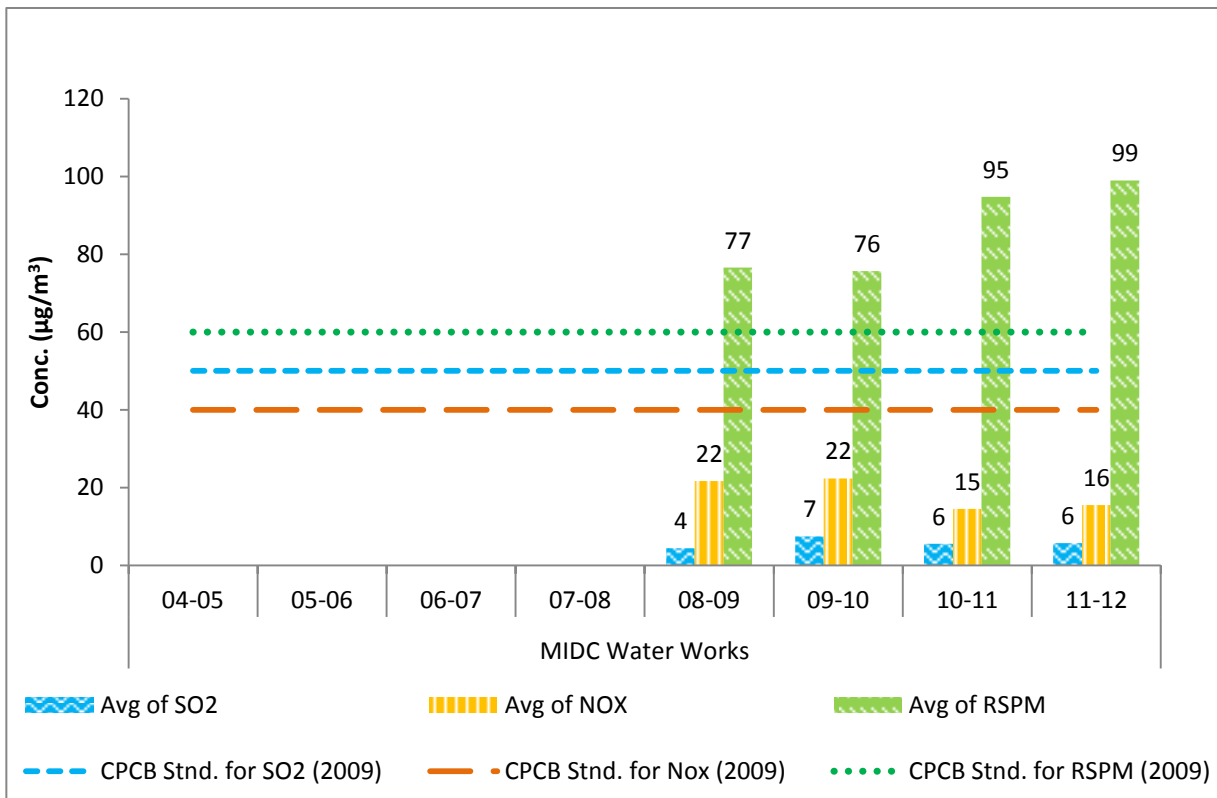


Figure No 44: Annual average trend of SO₂, NO_x and RSPM at MIDC Water Works – Latur

Latur - Shyam Nagar-Kshewraj Vidyalaya

Table No 42: Data for monthly average reading recorded at Shyam Nagar-Kshewraj Vidyalaya - Latur

FY	N	Monthly average ($\mu\text{g}/\text{m}^3$)		
		SO ₂	NO _x	RSPM
2011-12				
Apr	8	8	15	110
May	8	6	20	108
Jun	8	5	11	87
Jul	8	5	8	137
Aug	8	6	19	148
Sep	8	6	14	91
Oct	9	6	16	109
Nov	9	4	8	114
Dec	8	5	15	110
Jan	10	5	9	137
Feb	8	6	17	186
Mar	8	9	18	144
	Total N		% of exceedence	
	100	0.0	0.0	60.0

Table No 43: Data for annual average trend of SO₂, NO_x and RSPM at Shyam Nagar-Kshewraj Vidyalaya – Latur

Year	N	Annual average ($\mu\text{g}/\text{m}^3$)		
		SO ₂	NO _x	RSPM
		50	40	60
<i>Annual Standards</i>				
04-05	-	-	-	-
05-06	-	-	-	-
06-07	-	-	-	-
07-08	-	-	-	-
08-09	79	3	16	99
09-10	90	6	19	123
10-11	85	6	13	139
11-12	100	6	14	124

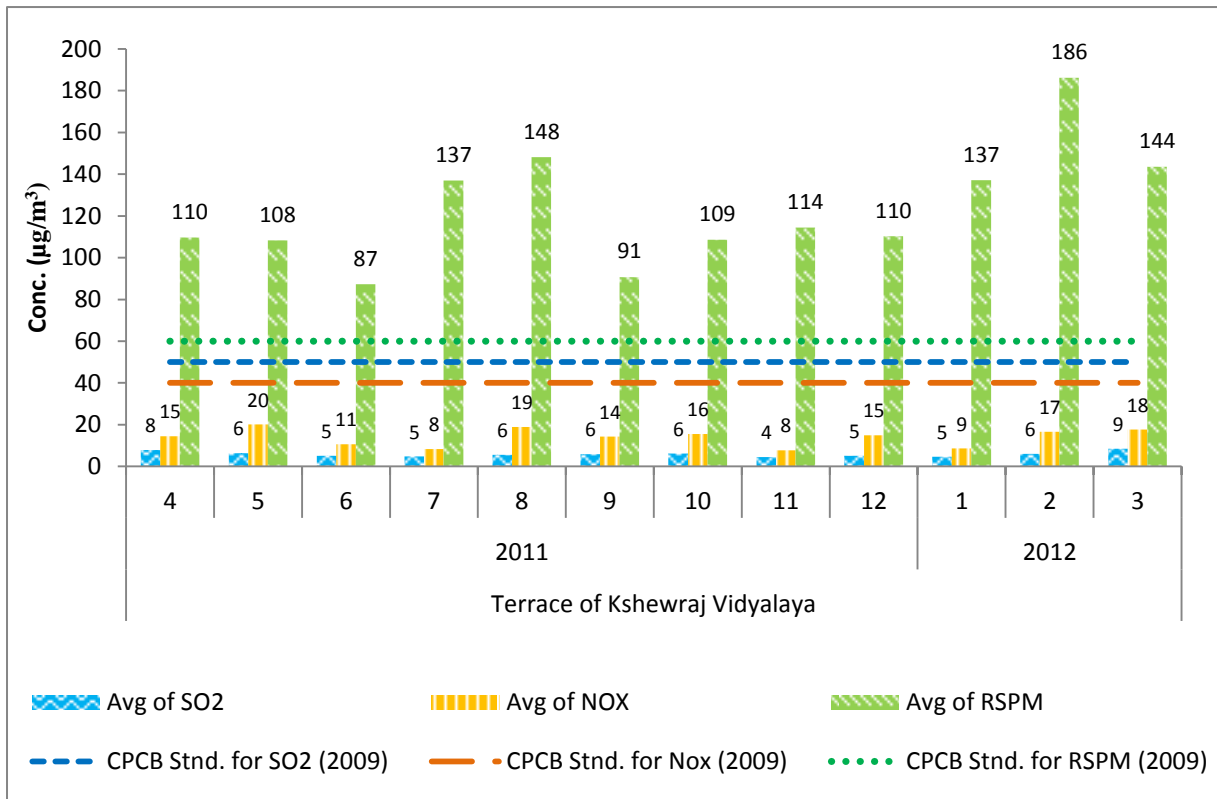


Figure No 45: Monthly average reading recorded at Shyam Nagar-Kshewraj Vidyalaya - Latur

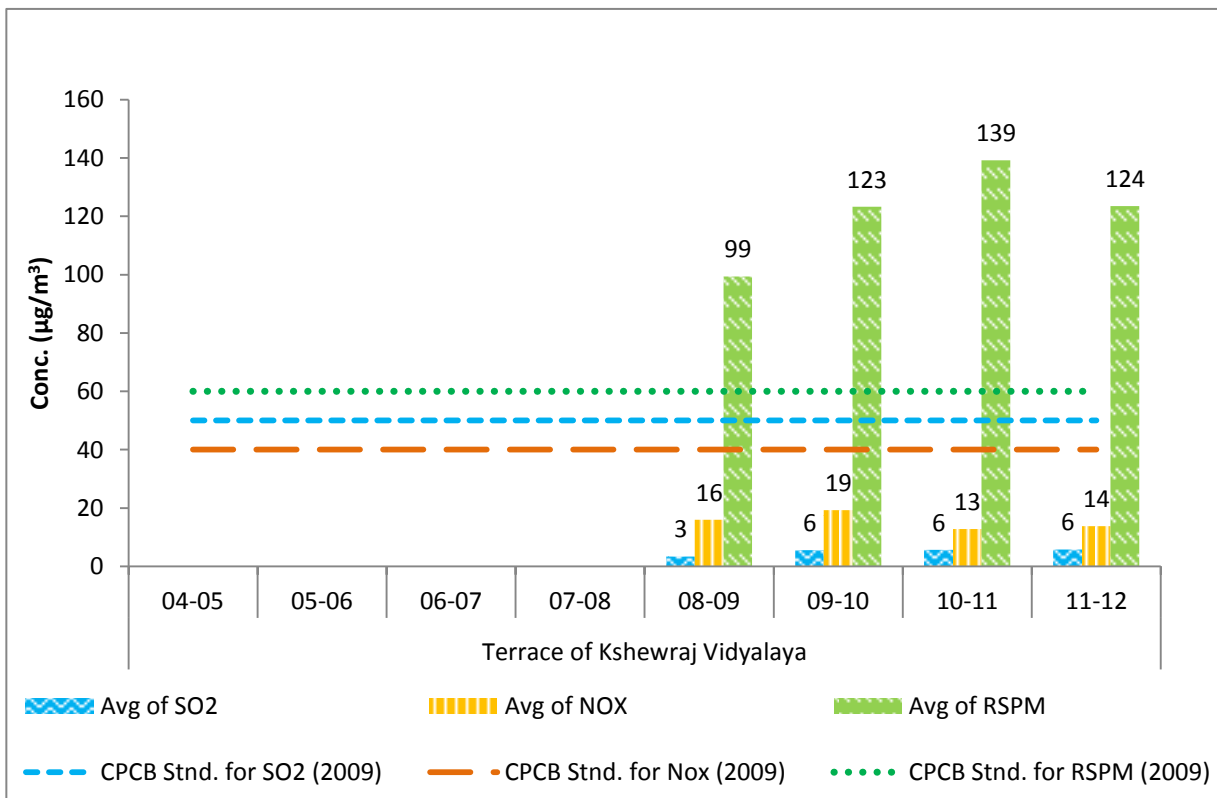


Figure No 46: Annual average trend of SO₂, NO_x and RSPM at Shyam Nagar-Kshewraj Vidyalaya – Latur

Latur - Ganj Golai - Sidhleshwar Bank

Table No 44: Data for monthly average reading recorded at Ganj Golai - Sidhleshwar Bank – Latur

FY	N	Monthly average ($\mu\text{g}/\text{m}^3$)		
		SO ₂	NO _x	RSPM
2011-12				
Apr	-	-	-	-
May	9	6	19	109
Jun	9	6	13	77
Jul	8	5	12	111
Aug	9	6	10	161
Sep	10	7	19	109
Oct	8	7	15	101
Nov	8	5	11	119
Dec	9	6	14	171
Jan	8	5	23	171
Feb	8	7	25	180
Mar	9	9	26	238
Total N		% of exceedence		
95		0.0	0.0	68.4

Table No 45: Data for annual average trend of SO₂, NO_x and RSPM at Ganj Golai - Sidhleshwar Bank – Latur

Year	N	Annual average ($\mu\text{g}/\text{m}^3$)		
		SO ₂	NO _x	RSPM
Annual Standards		50	40	60
04-05	-	-	-	-
05-06	-	-	-	-
06-07	-	-	-	-
07-08	-	-	-	-
08-09	91	4	22	122
09-10	74	6	26	144
10-11	89	6	16	124
11-12	95	6	17	140

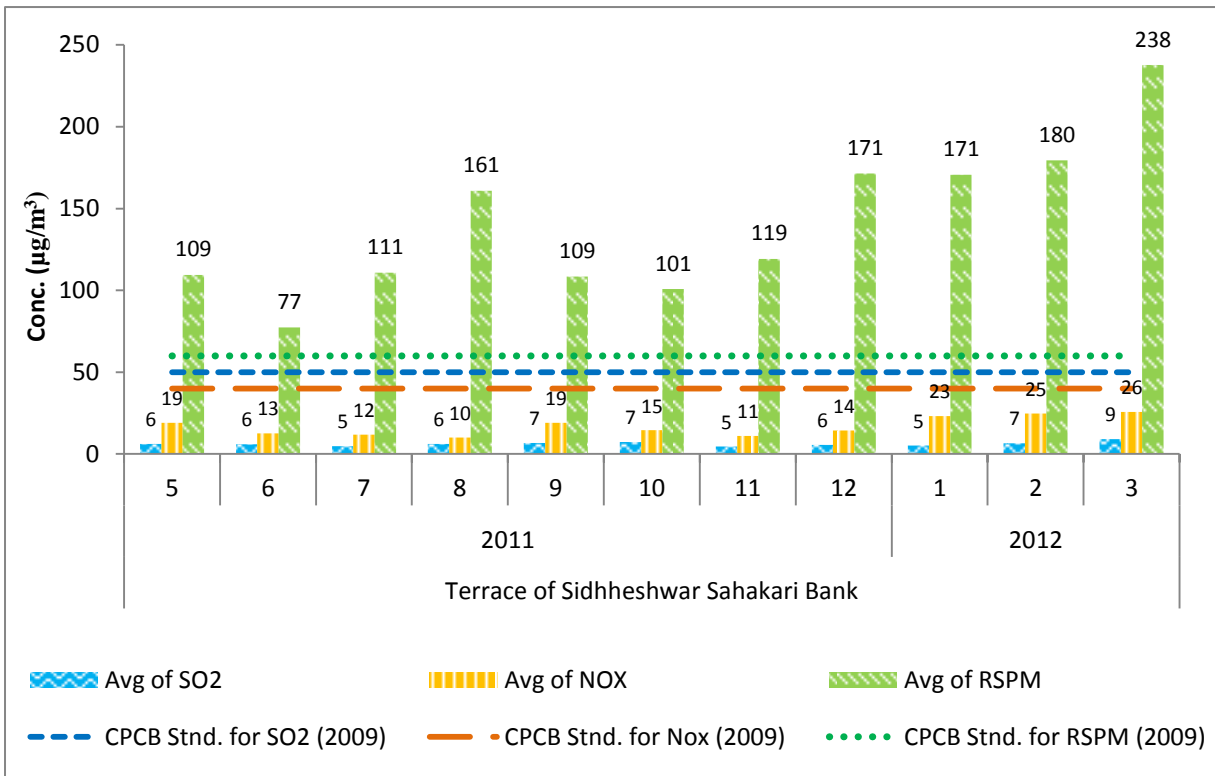


Figure No 47: Monthly average reading recorded at Ganj Golai - Sidhsheshwar Bank – Latur

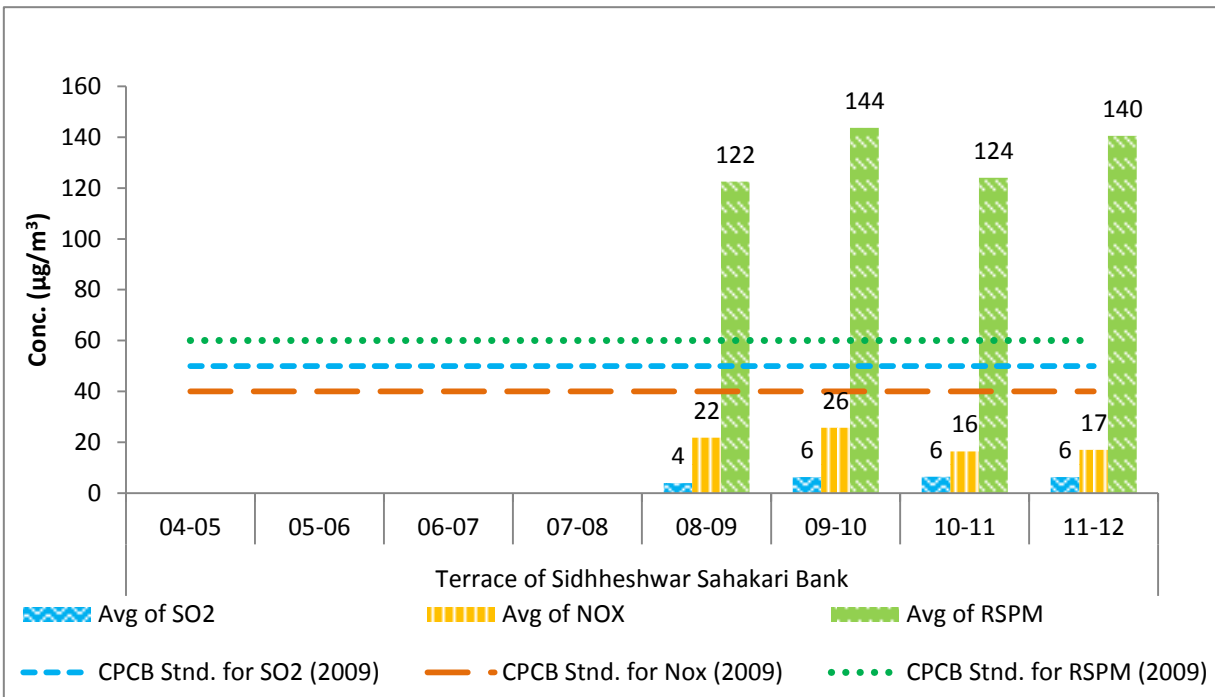


Figure No 48: Annual average trend of SO₂, NO_x and RSPM at Ganj Golai - Sidhsheshwar Bank – Latur

Nanded - Ganeshnagar

Table No 46: Data for monthly average reading recorded at Ganeshnagar – Nanded

FY	N	Monthly average ($\mu\text{g}/\text{m}^3$)		
		SO ₂	NO _x	RSPM
2011-12				
Apr	8	35	34	47
May	8	42	42	56
Jun	10	8	8	8
Jul	8	10	10	11
Aug	9	5	10	6
Sep	9	18	19	21
Oct	-	-	-	-
Nov	-	-	-	-
Dec	9	18	17	25
Jan	8	17	17	26
Feb	9	18	17	30
Mar	9	17	17	31
Total N		% of exceedence		
	87	0.0	0.0	0.0

Table No 47: Data for annual average trend of SO₂, NO_x and RSPM at Ganeshnagar – Nanded

Year	N	Annual average ($\mu\text{g}/\text{m}^3$)		
		SO ₂	NO _x	RSPM
Annual Standards		50	40	60
04-05	-	-	-	-
05-06	-	-	-	-
06-07	-	-	-	-
07-08	-	-	-	-
08-09	-	-	-	-
09-10	-	-	-	-
10-11	10	28	29	47
11-12	87	18	19	26

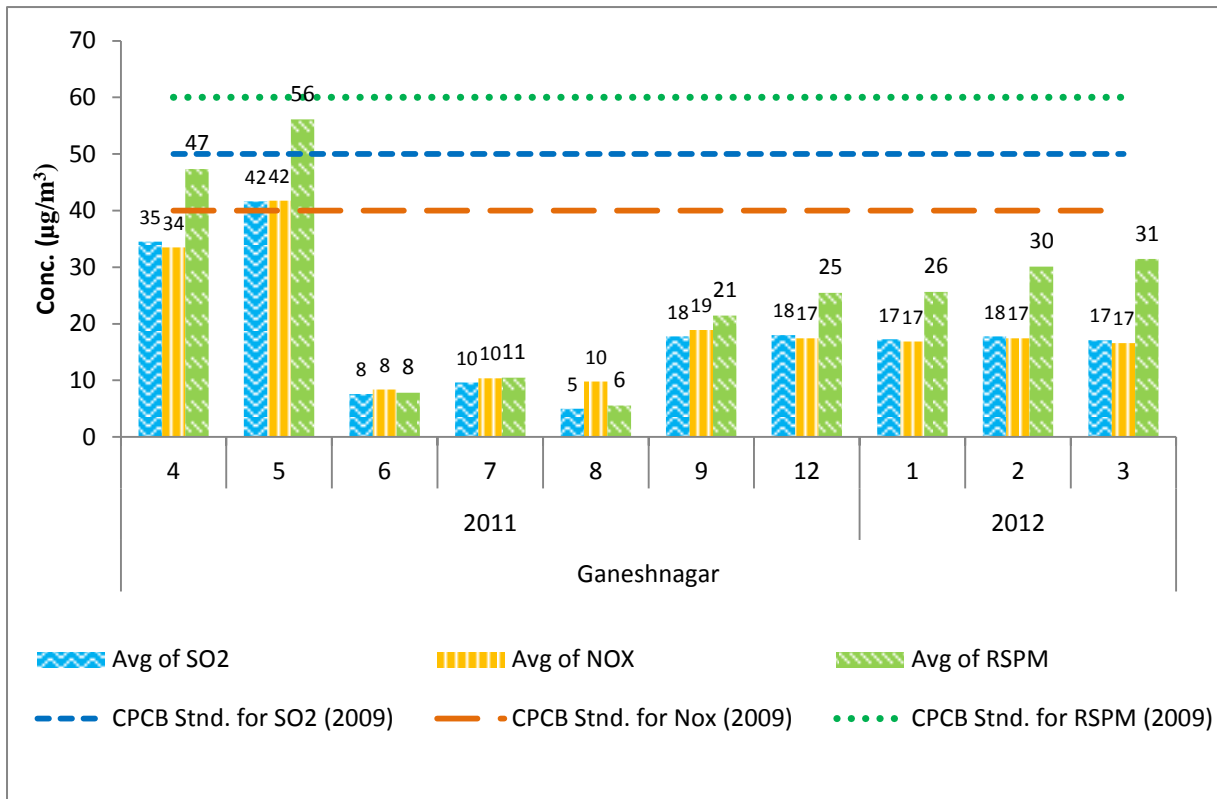


Figure No 49: Monthly average reading recorded at Ganeshnagar – Nanded

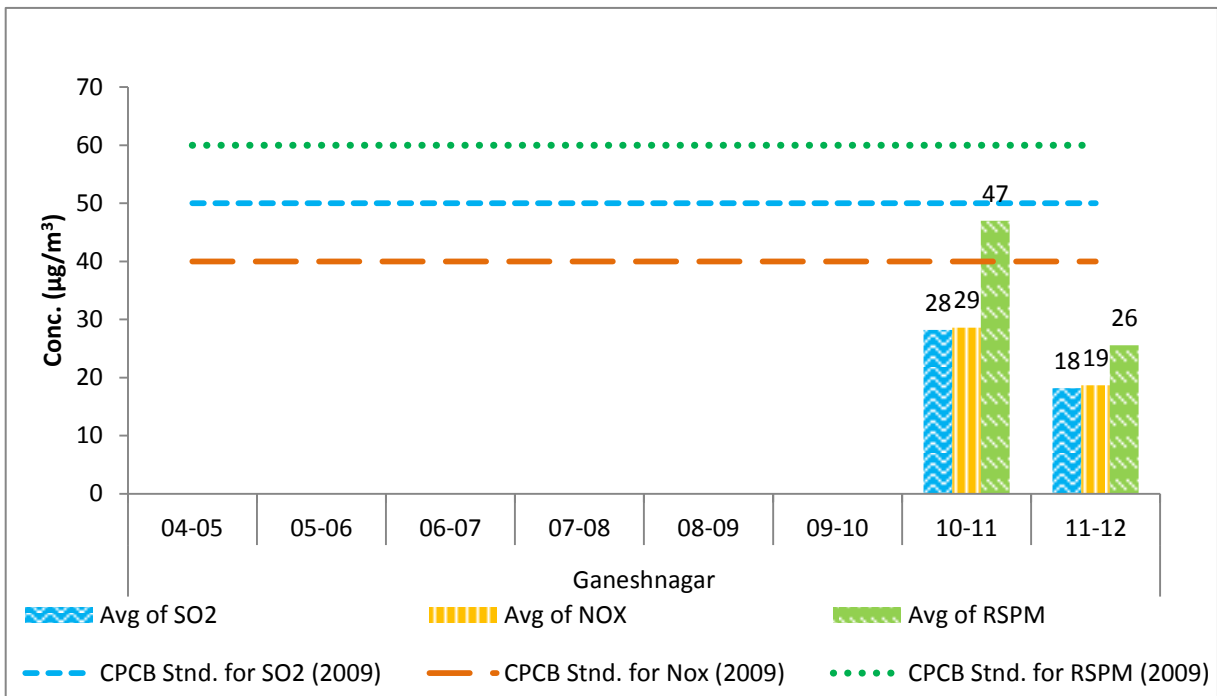


Figure No 50: Annual average trend of SO₂, NO_x and RSPM at Ganeshnagar – Nanded

Nanded - Industrial Area CIDCO

Table No 48: Data for monthly average reading recorded at Industrial Area CIDCO – Nanded

FY	N	Monthly average ($\mu\text{g}/\text{m}^3$)		
		SO ₂	NO _x	RSPM
2011-12				
Apr	8	94	94	135
May	9	57	60	80
Jun	8	29	32	41
Jul	8	9	11	15
Aug	9	8	11	10
Sep	8	47	53	75
Oct	-	-	-	-
Nov	-	-	-	-
Dec	8	40	41	65
Jan	10	38	42	65
Feb	8	53	53	83
Mar	8	56	57	88
	Total N		% of exceedence	
	84	9.5	10.7	9.5

Table No 49: Data for annual average trend of SO₂, NO_x and RSPM at Industrial Area CIDCO – Nanded

Year	N	Annual average ($\mu\text{g}/\text{m}^3$)		
		SO ₂	NO _x	RSPM
		50	40	60
<i>Annual Standards</i>				
04-05	-	-	-	-
05-06	-	-	-	-
06-07	-	-	-	-
07-08	-	-	-	-
08-09	-	-	-	-
09-10	-	-	-	-
10-11	-	-	-	-
11-12	84	43	45	65

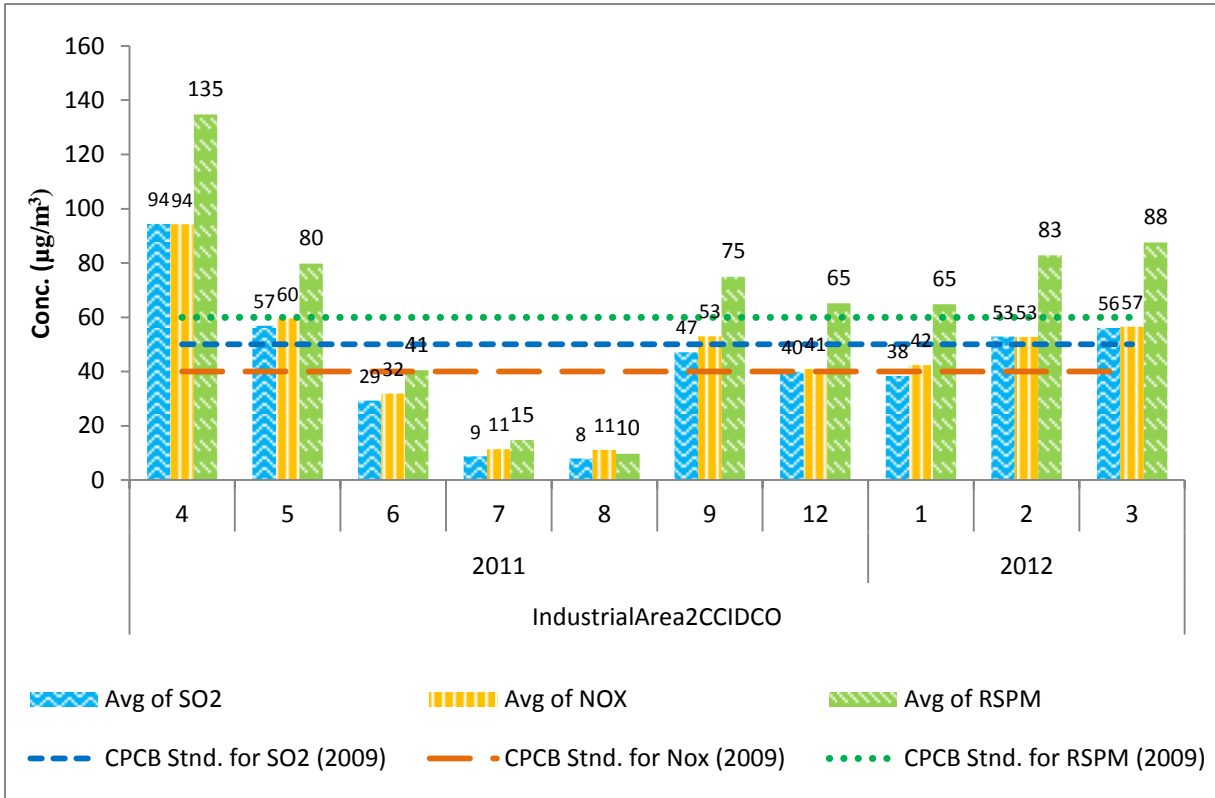


Figure No 51: Monthly average reading recorded at Industrial Area CIDCO – Nanded

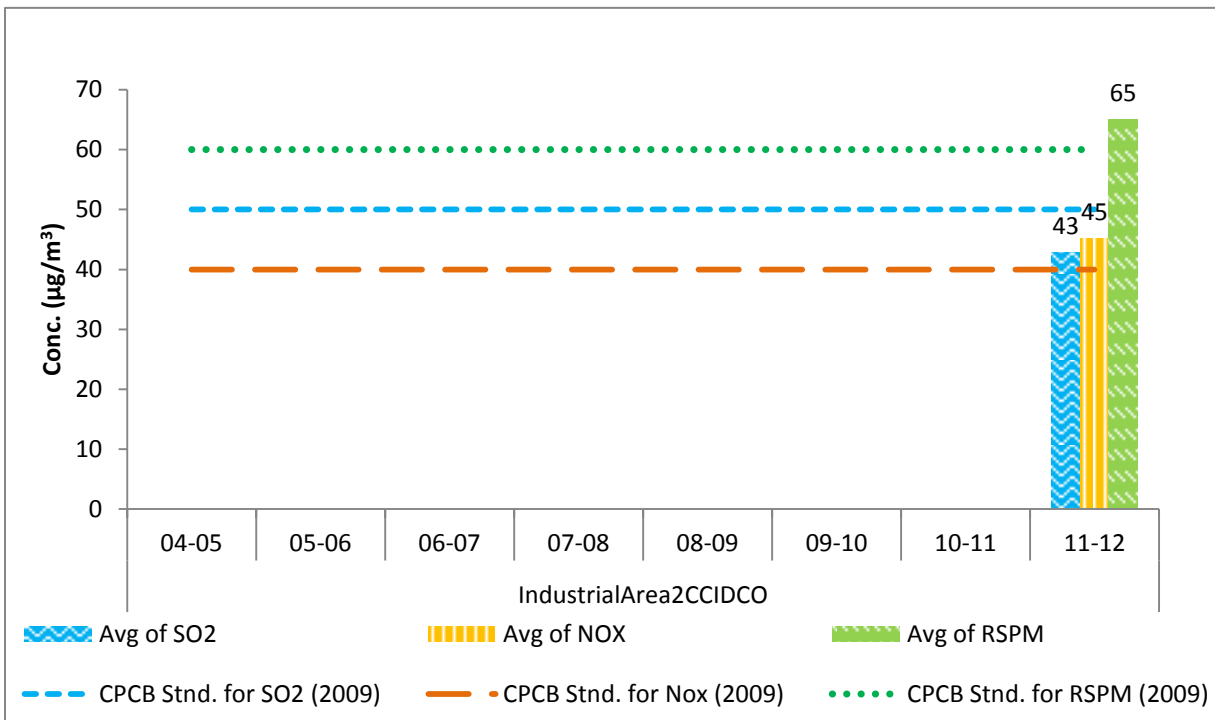
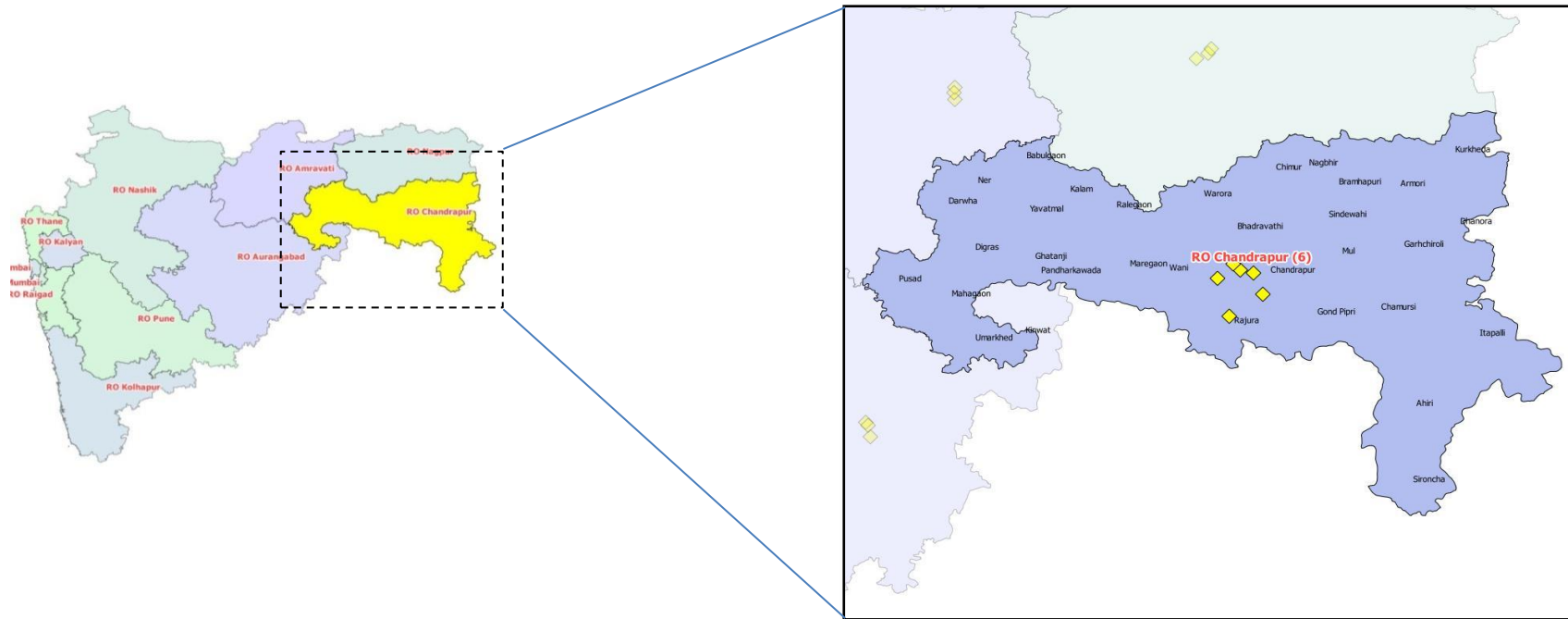


Figure No 52: Annual average trend of SO₂, NO_x and RSPM at Industrial Area CIDCO – Nanded

RO - Chandrapur



Region	Program	Station Codes	Station	Frequency	Latitude	Longitude
Chandrapur	NAMP	267	Ghuggus	Two Days In A Week	19° 56.383'	79° 06.848'
		281	MIDC, Chandrapur	Two Days In A Week	19° 58.971'	79° 13.912'
		396	SRO Office, Chandrapur	Two Days In A Week	19° 57.931'	79° 17.985'
	NAMP	639	Ballarshah	Two Days In A Week	19° 51.197'	79° 20.929'
		640	Rajura	Two Days In A Week	19° 44.195'	79° 10.492'
		638	Tadali MIDC	Two Days In A Week	20° 00.994'	79° 11.858'

Chandrapur - Ghuggus

Table No 50: Data for monthly average reading recorded at Ghuggus – Chandrapur

FY	N	Monthly average ($\mu\text{g}/\text{m}^3$)		
		SO ₂	NO _x	RSPM
2011-12				
Apr	8	48	35	227
May	7	26	15	232
Jun	10	16	30	238
Jul	8	15	19	176
Aug	10	12	12	132
Sep	6	13	15	200
Oct	6	13	34	207
Nov	10	12	15	203
Dec	8	9	8	206
Jan	8	20	26	214
Feb	8	18	20	204
Mar	6	19	26	265
	Total N		% of exceedence	
	95	0.0	0.0	95.8

Table No 51: Data for annual average trend of SO₂, NO_x and RSPM at Ghuggus – Chandrapur

Year	N	Annual average ($\mu\text{g}/\text{m}^3$)		
		SO ₂	NO _x	RSPM
		50	40	60
<i>Annual Standards</i>				
04-05	80	18	28	80
05-06	96	21	31	131
06-07	75	31	39	139
07-08	95	36	53	186
08-09	86	34	54	172
09-10	77	46	32	180
10-11	103	23	24	211
11-12	95	18	21	206

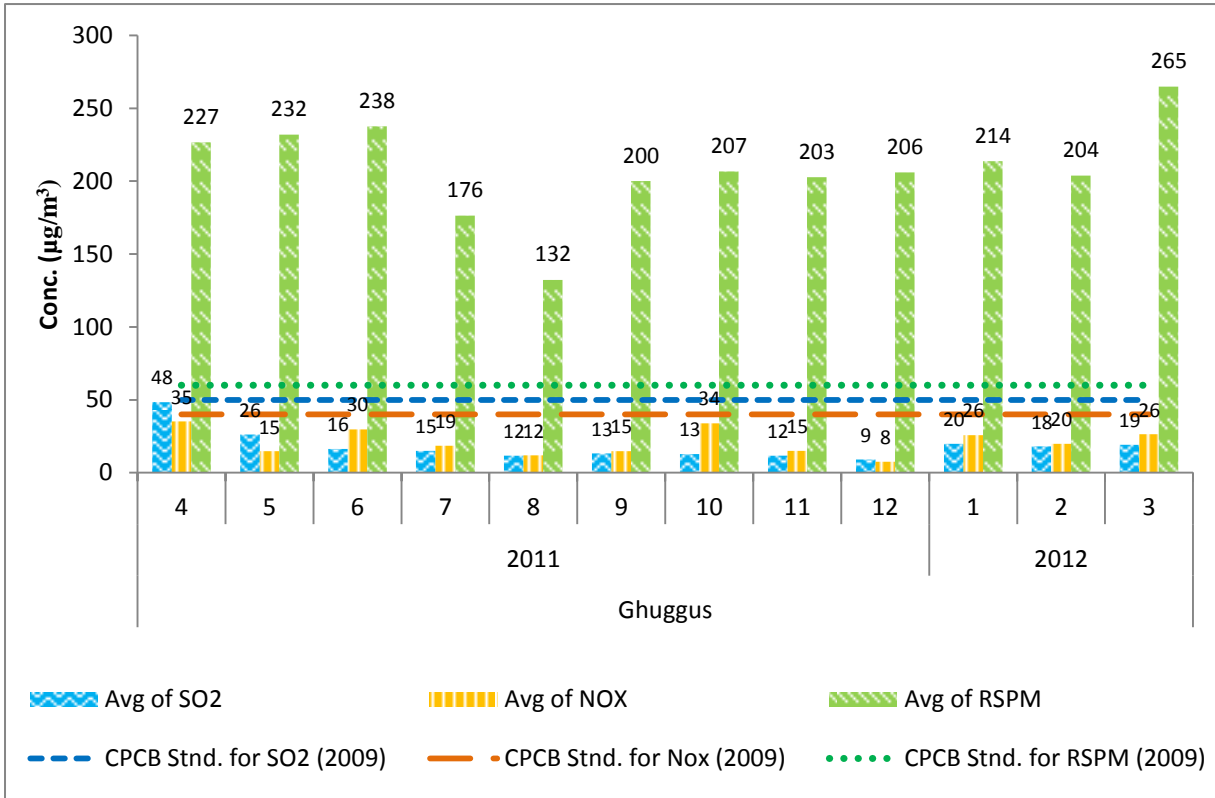


Figure No 53: Monthly average reading recorded at Ghuggus – Chandrapur

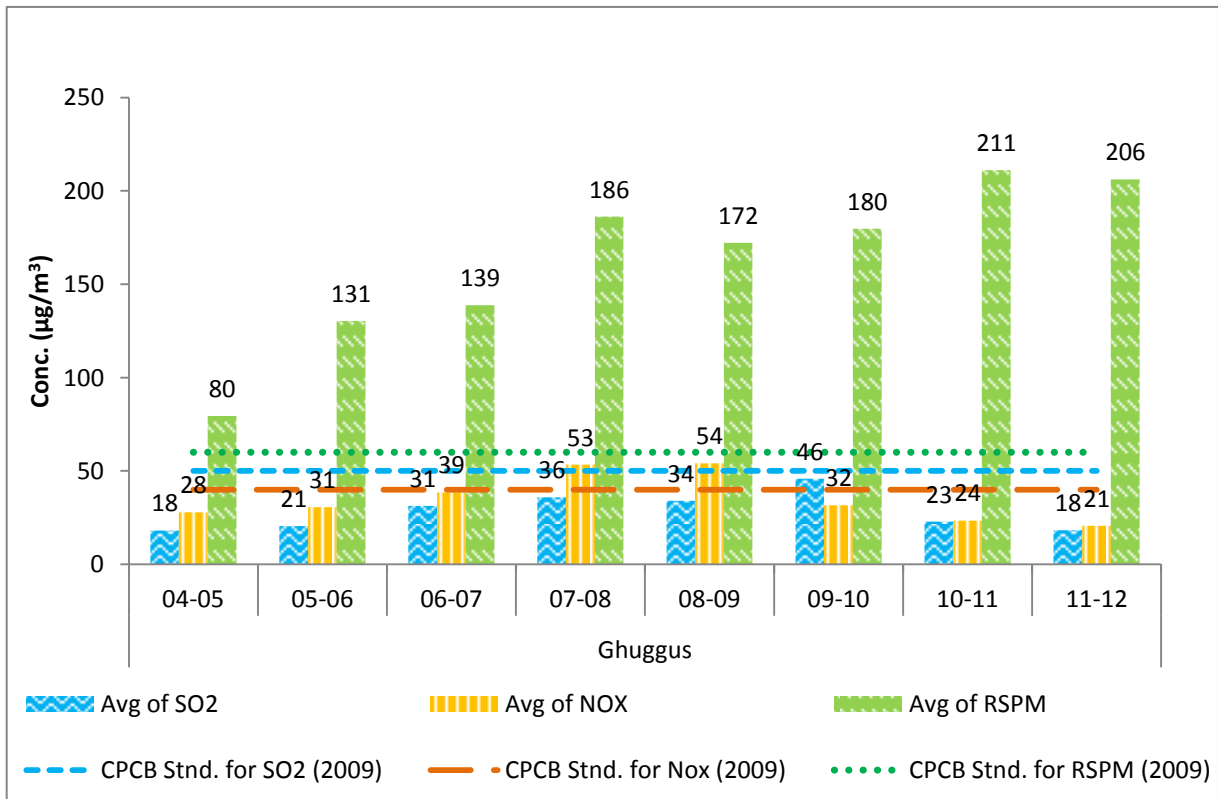


Figure No 54: Annual average trend of SO₂, NO_x and RSPM at Ghuggus – Chandrapur

Chandrapur - MIDC Chandrapur

Table No 52: Data for monthly average reading recorded at MIDC Chandrapur

FY	N	Monthly average ($\mu\text{g}/\text{m}^3$)		
		SO ₂	NO _x	RSPM
2011-12				
Apr	10	46	46	156
May	8	35	41	251
Jun	10	19	31	115
Jul	10	14	21	78
Aug	10	12	21	43
Sep	8	12	15	87
Oct	8	23	45	178
Nov	10	30	39	143
Dec	10	14	42	164
Jan	10	14	45	113
Feb	8	24	39	144
Mar	6	12	38	131
Total N		% of exceedence		
108		0.0	1.9	68.5

Table No 53: Data for annual average trend of SO₂, NO_x and RSPM at MIDC Chandrapur

Year	N	Annual average ($\mu\text{g}/\text{m}^3$)		
		SO ₂	NO _x	RSPM
Annual Standards		50	40	60
04-05	95	25	37	110
05-06	92	26	37	130
06-07	97	38	41	123
07-08	98	37	50	125
08-09	81	34	53	148
09-10	79	63	31	141
10-11	102	25	25	150
11-12	108	21	35	131

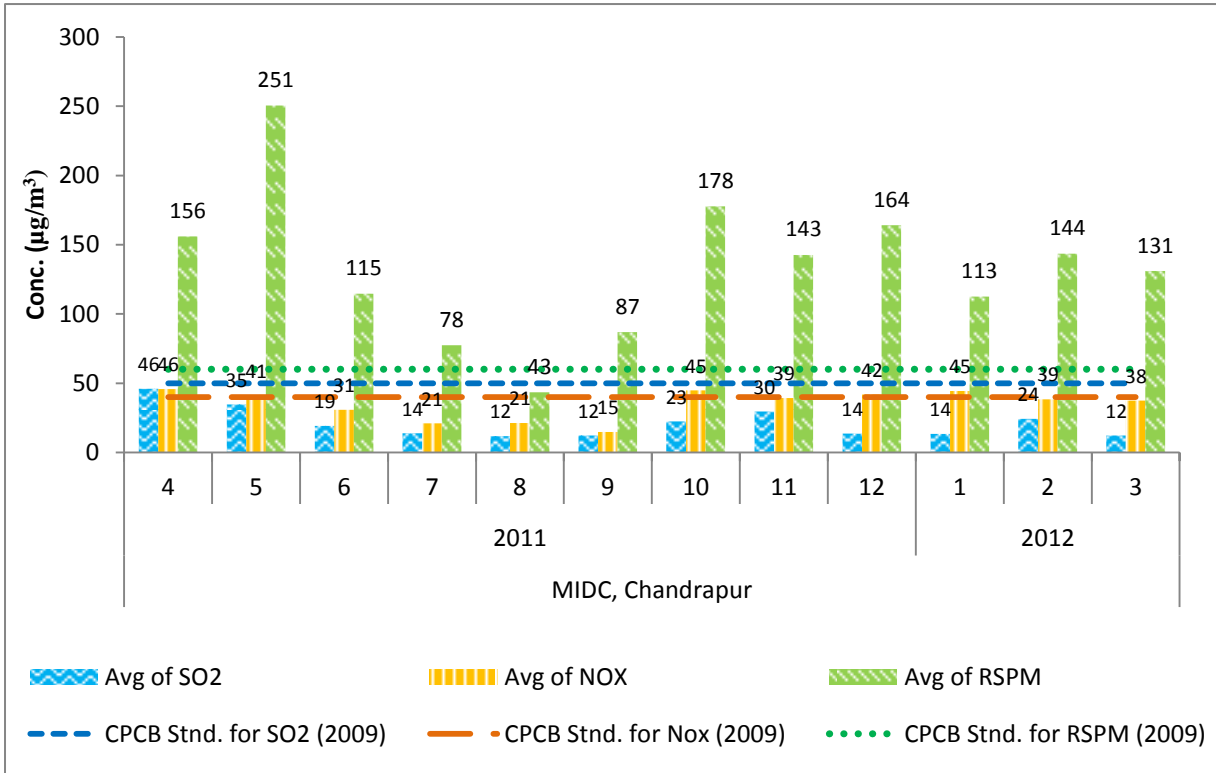


Figure No 55: Monthly average reading recorded at MIDC Chandrapur

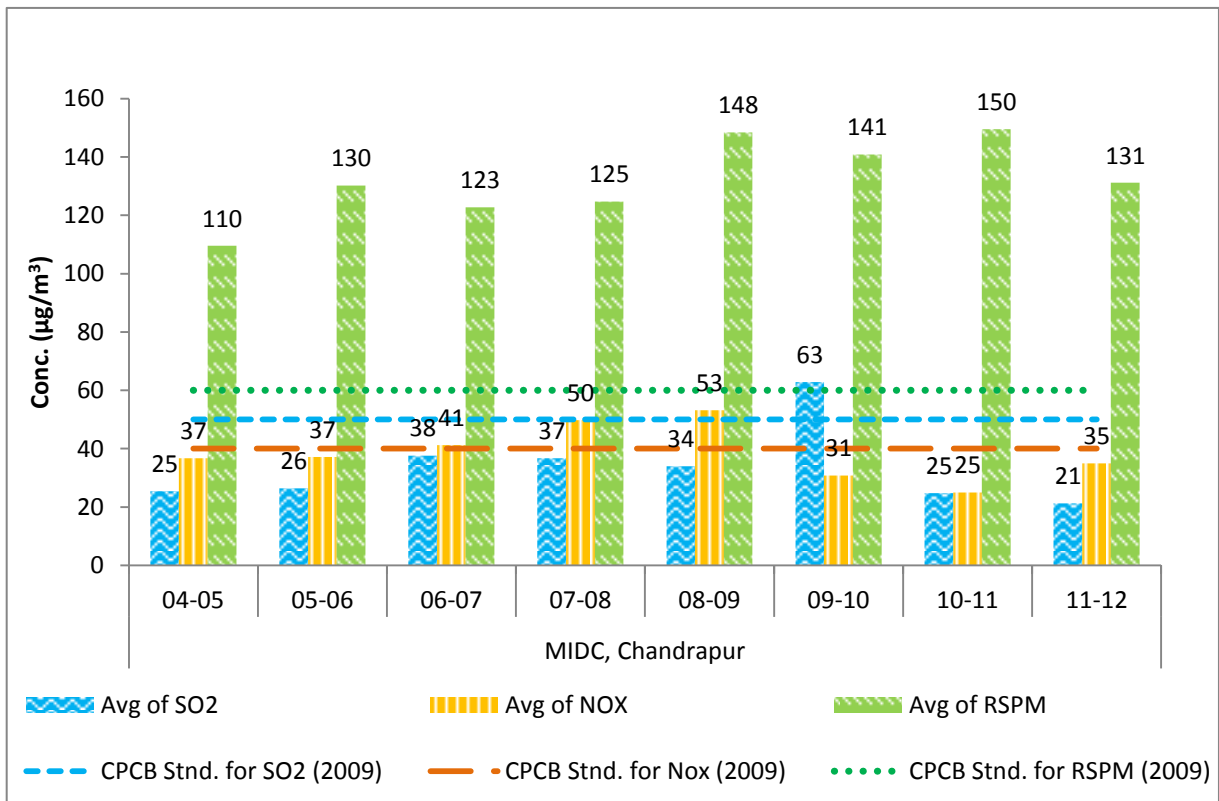


Figure No 56: Annual average trend of SO₂, NO_x and RSPM at MIDC Chandrapur

Chandrapur - SRO Office, Chandrapur

Table No 54: Data for monthly average reading recorded at SRO Office, Chandrapur

FY	N	Monthly average ($\mu\text{g}/\text{m}^3$)		
		SO ₂	NO _x	RSPM
2011-12				
Apr	8	47	51	48
May	8	34	37	116
Jun	10	19	30	62
Jul	8	21	23	46
Aug	10	13	18	34
Sep	10	13	23	40
Oct	6	14	23	56
Nov	10	20	27	65
Dec	10	5	41	100
Jan	10	8	34	52
Feb	8	14	34	84
Mar	2	16	41	173
Total N		% of exceedence		
100		0.0	0.0	17.0

Table No 55: Data for annual average trend of SO₂, NO_x and RSPM at SRO Office, Chandrapur

Year	N	Annual average ($\mu\text{g}/\text{m}^3$)		
		SO ₂	NO _x	RSPM
<i>Annual Standards</i>		50	40	60
04-05	70	23	34	107
05-06	90	20	30	116
06-07	88	31	38	130
07-08	98	30	46	161
08-09	82	26	45	159
09-10	76	41	35	74
10-11	102	21	27	92
11-12	100	18	31	66

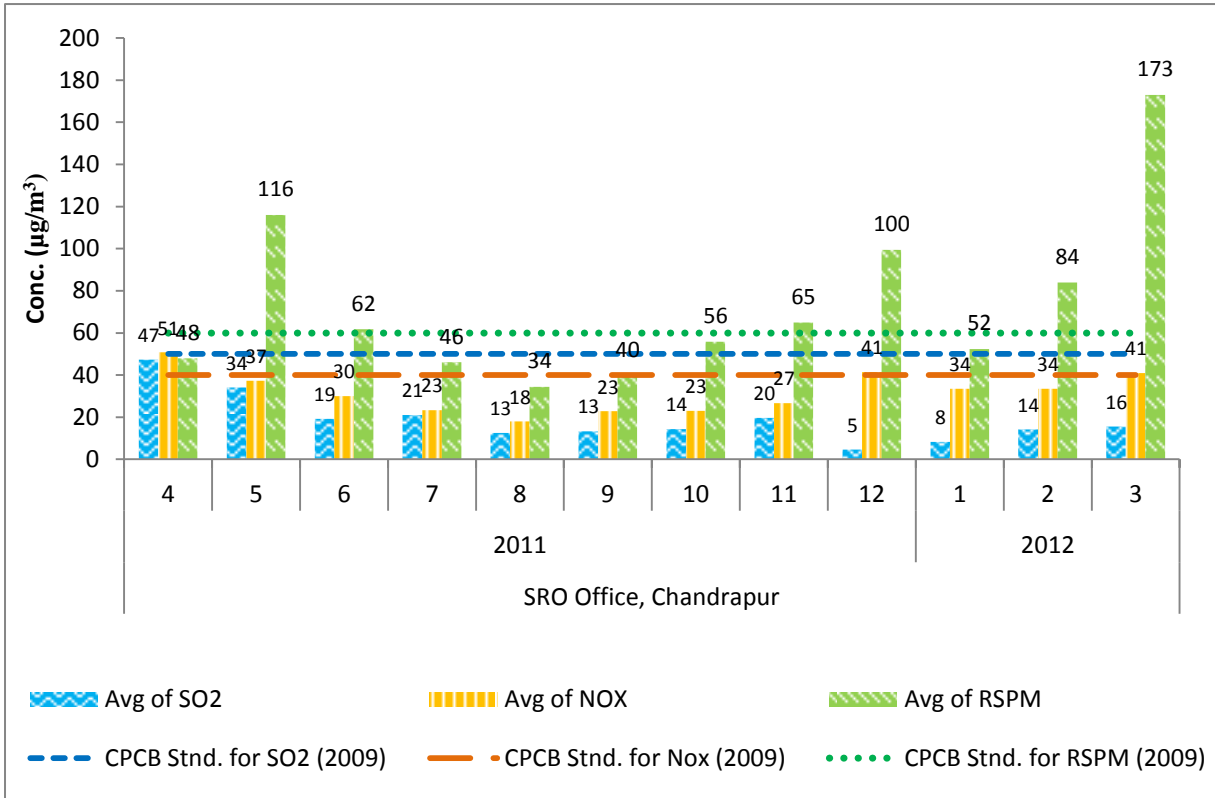


Figure No 57: Monthly average reading recorded at SRO Office, Chandrapur

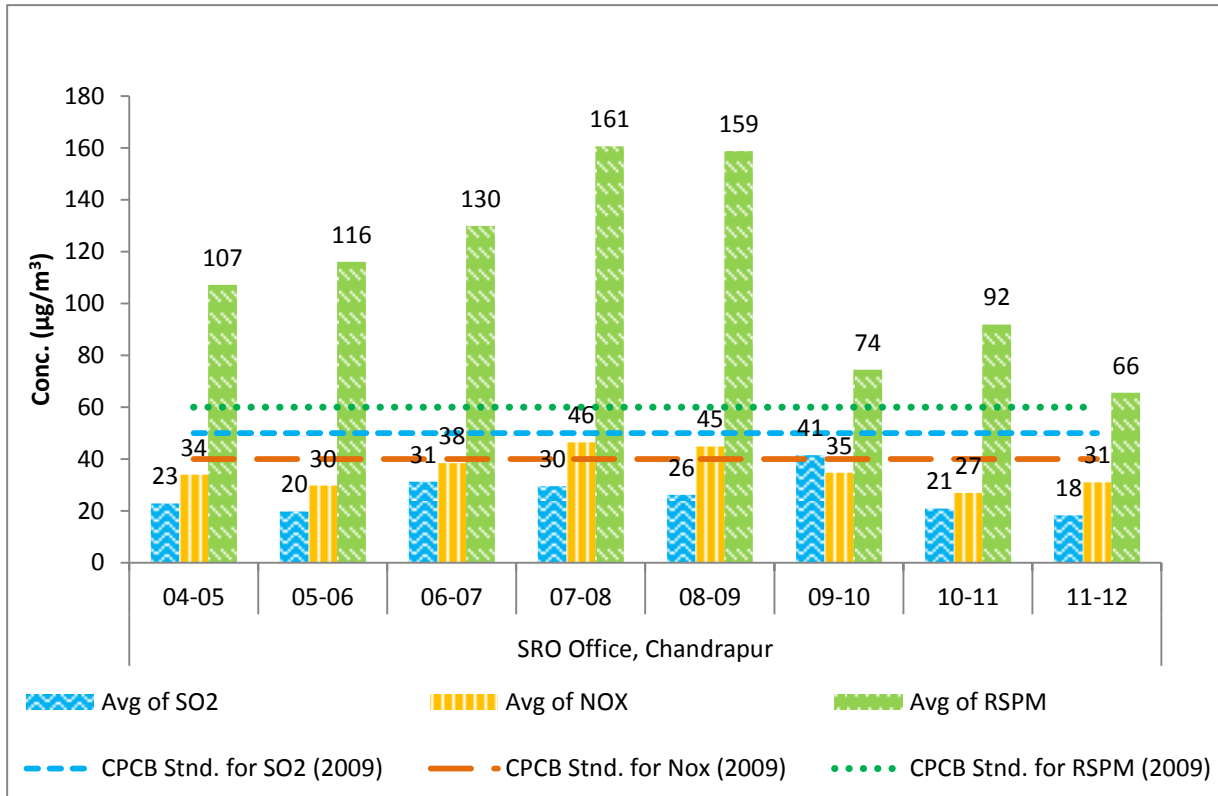


Figure No 58: Annual average trend of SO₂, NO_x and RSPM at SRO Office, Chandrapur

Chandrapur - Ballarshah

Table No 56: Data for monthly average reading recorded at Ballarshah, Chandrapur

FY	N	Monthly average ($\mu\text{g}/\text{m}^3$)		
		SO ₂	NO _x	RSPM
2011-12				
Apr	8	45	37	97
May	10	31	30	139
Jun	10	18	20	67
Jul	6	13	21	66
Aug	-	-	-	-
Sep	-	-	-	-
Oct	6	13	30	153
Nov	-	-	-	-
Dec	9	8	30	205
Jan	9	11	9	98
Feb	6	16	22	117
Mar	4	9	12	204
	Total N		% of exceedence	
	68	0.0	0.0	52.9

Table No 57: Data for annual average trend of SO₂, NO_x and RSPM at Ballarshah, Chandrapur

Year	N	Annual average ($\mu\text{g}/\text{m}^3$)		
		SO ₂	NO _x	RSPM
<i>Annual Standards</i>		50	40	60
04-05	-	-	-	-
05-06	-	-	-	-
06-07	-	-	-	-
07-08	-	-	-	-
08-09	-	-	-	-
09-10	65	32	35	122
10-11	107	17	32	129
11-12	68	19	24	123

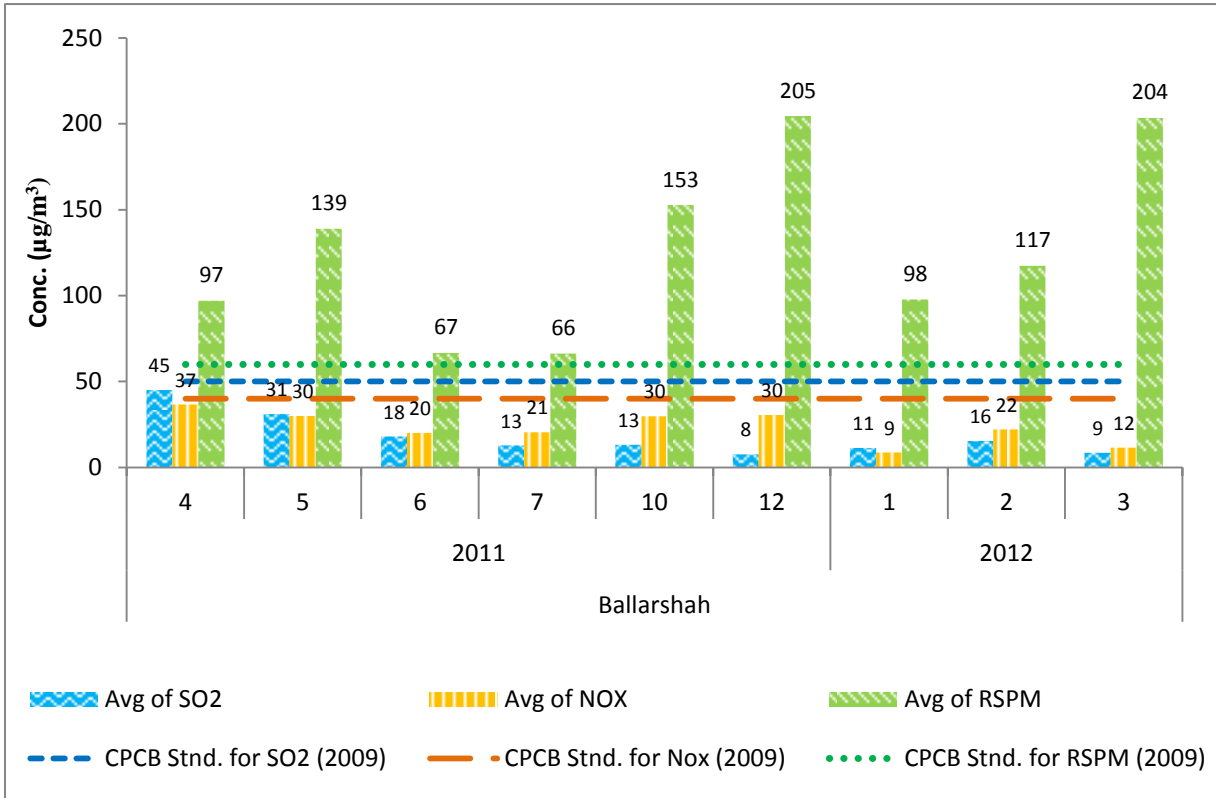


Figure No 59: Monthly average reading recorded at Ballarshah, Chandrapur

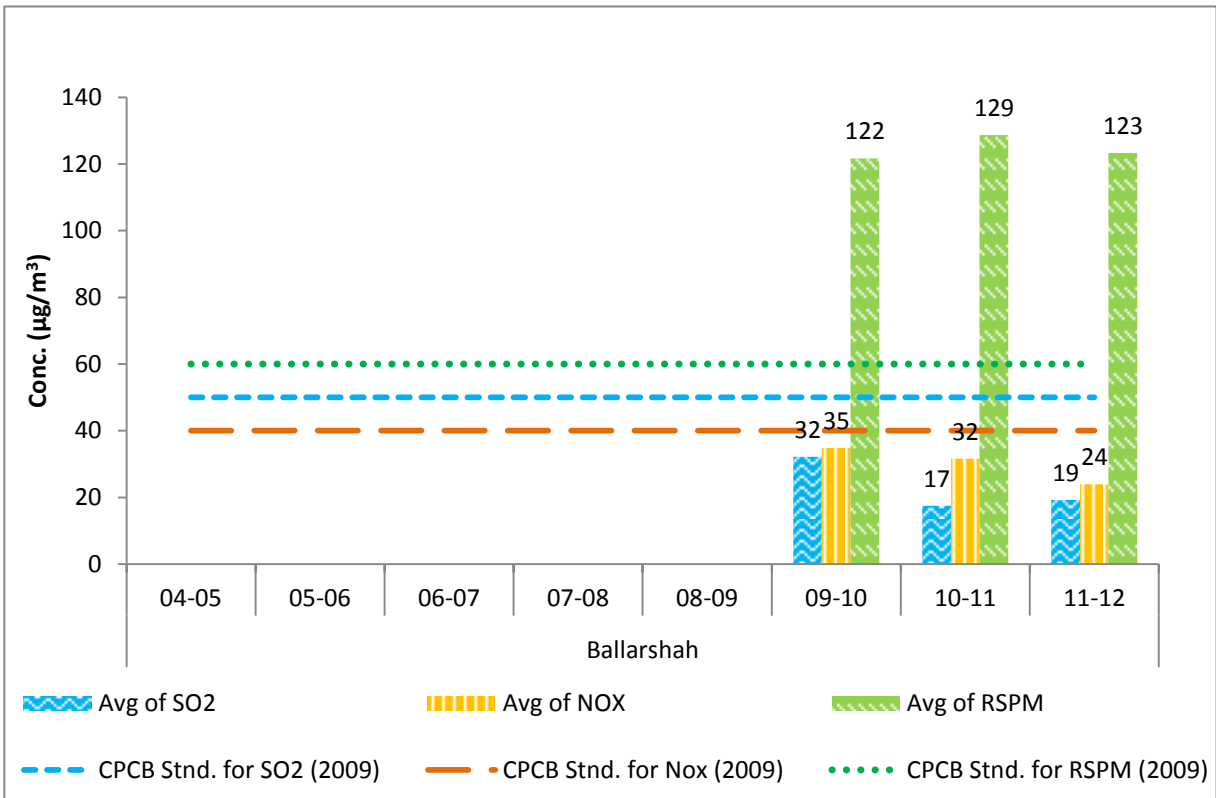


Figure No 60: Annual average trend of SO₂, NO_x and RSPM at Ballarshah, Chandrapur

Chandrapur - Rajura

Table No 58: Data for monthly average reading recorded at Rajura, Chandrapur

FY	N	Monthly average ($\mu\text{g}/\text{m}^3$)		
		SO ₂	NO _x	RSPM
2011-12				
Apr	8	38	25	167
May	8	24	17	203
Jun	6	16	24	198
Jul	8	13	15	147
Aug	8	10	12	101
Sep	6	13	14	159
Oct	6	14	23	152
Nov	8	13	10	179
Dec	4	8	43	159
Jan	9	8	23	135
Feb	-	-	-	-
Mar	-	-	-	-
	Total N		% of exceedence	
	71	0.0	0.0	87.3

Table No 59: Data for annual average trend of SO₂, NO_x and RSPM at Rajura, Chandrapur

Year	N	Annual average ($\mu\text{g}/\text{m}^3$)		
		SO ₂	NO _x	RSPM
<i>Annual Standards</i>		50	40	60
04-05	-	-	-	-
05-06	-	-	-	-
06-07	-	-	-	-
07-08	-	-	-	-
08-09	-	-	-	-
09-10	30	34	37	119
10-11	93	17	19	115
11-12	71	16	19	159

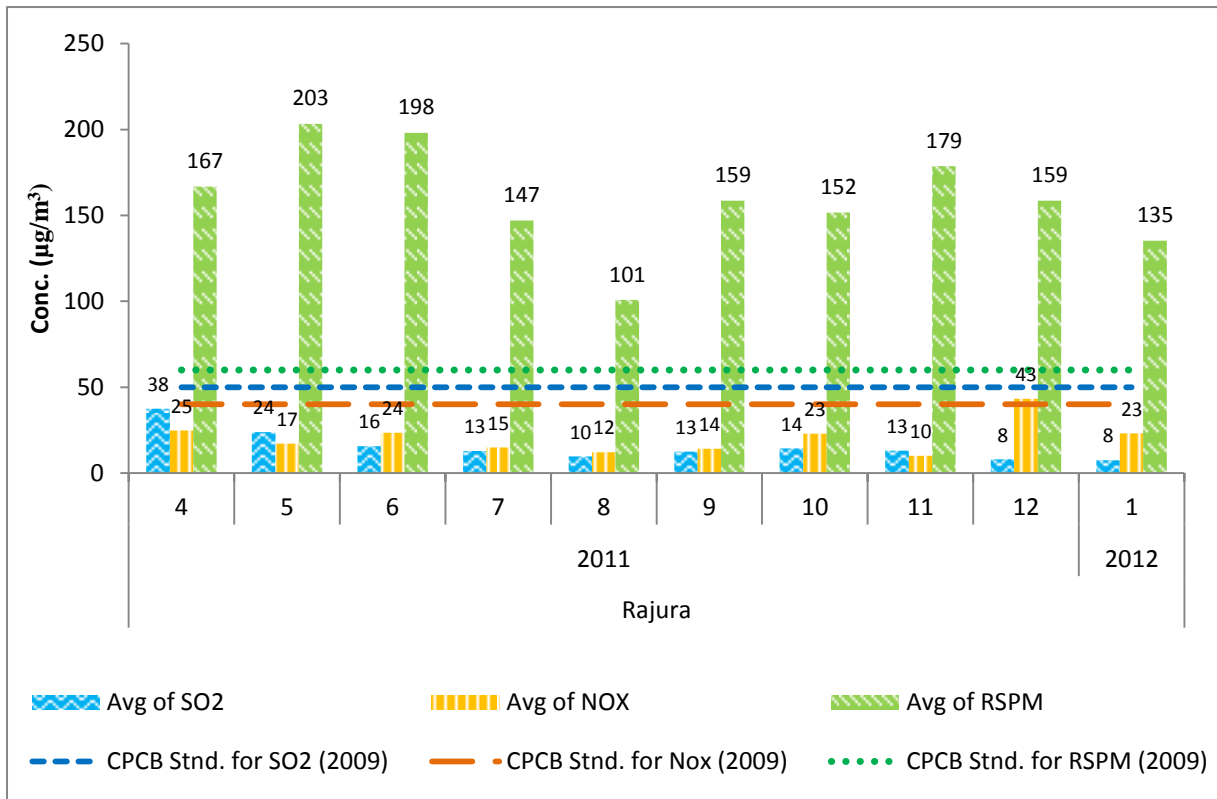


Figure No 61: Monthly average reading recorded at Rajura, Chandrapur

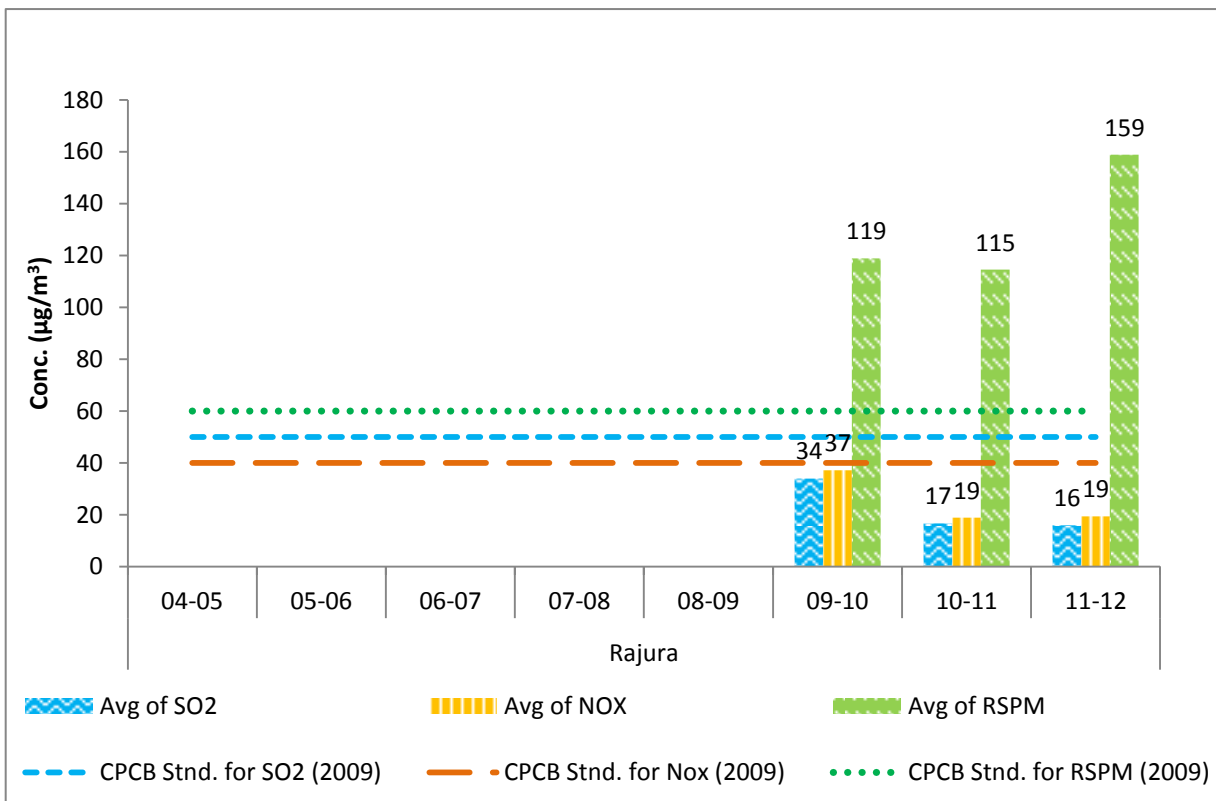


Figure No 62: Annual average trend of SO₂, NO_x and RSPM at Rajura, Chandrapur

Chandrapur – Tadali MIDC

Table No 60: Data for monthly average reading recorded at Tadali MIDC, Chandrapur

FY	N	Monthly average ($\mu\text{g}/\text{m}^3$)		
		SO ₂	NO _x	RSPM
2011-12				
Apr	8	48	35	155
May	8	13	13	170
Jun	10	16	15	244
Jul	8	16	15	137
Aug	10	10	16	103
Sep	6	12	12	102
Oct	6	10	31	134
Nov	10	13	13	152
Dec	8	5	12	141
Jan	-	-	-	-
Feb	8	12	20	108
Mar	6	19	25	199
	Total N		% of exceedence	
	88	0.0	0.0	81.8

Table No 61: Data for annual average trend of SO₂, NO_x and RSPM at Tadali MIDC– Chandrapur

Year	N	Annual average ($\mu\text{g}/\text{m}^3$)		
		SO ₂	NO _x	RSPM
Annual Standards		50	40	60
04-05	-	-	-	-
05-06	-	-	-	-
06-07	-	-	-	-
07-08	-	-	-	-
08-09	-	-	-	-
09-10	59	29	19	169
10-11	65	18	20	216
11-12	88	16	18	151

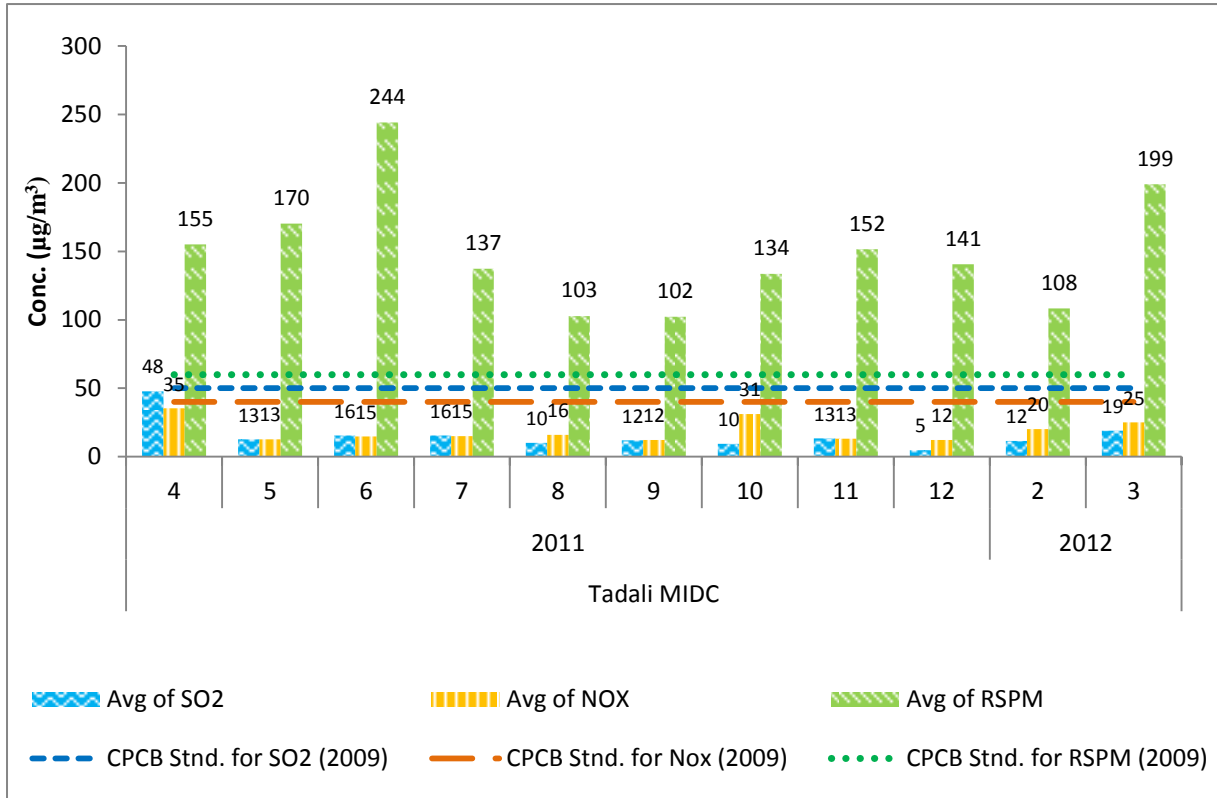


Figure No 63: Monthly average reading recorded at Tadali MIDC, Chandrapur

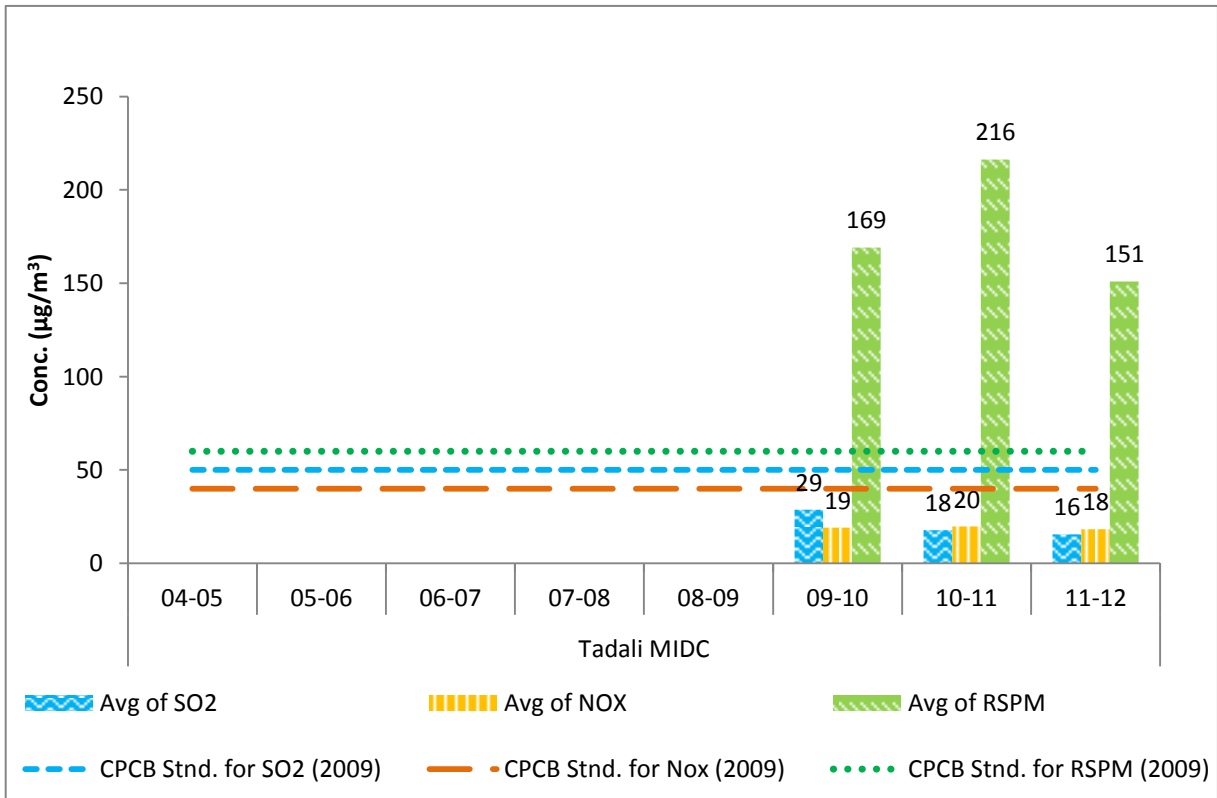
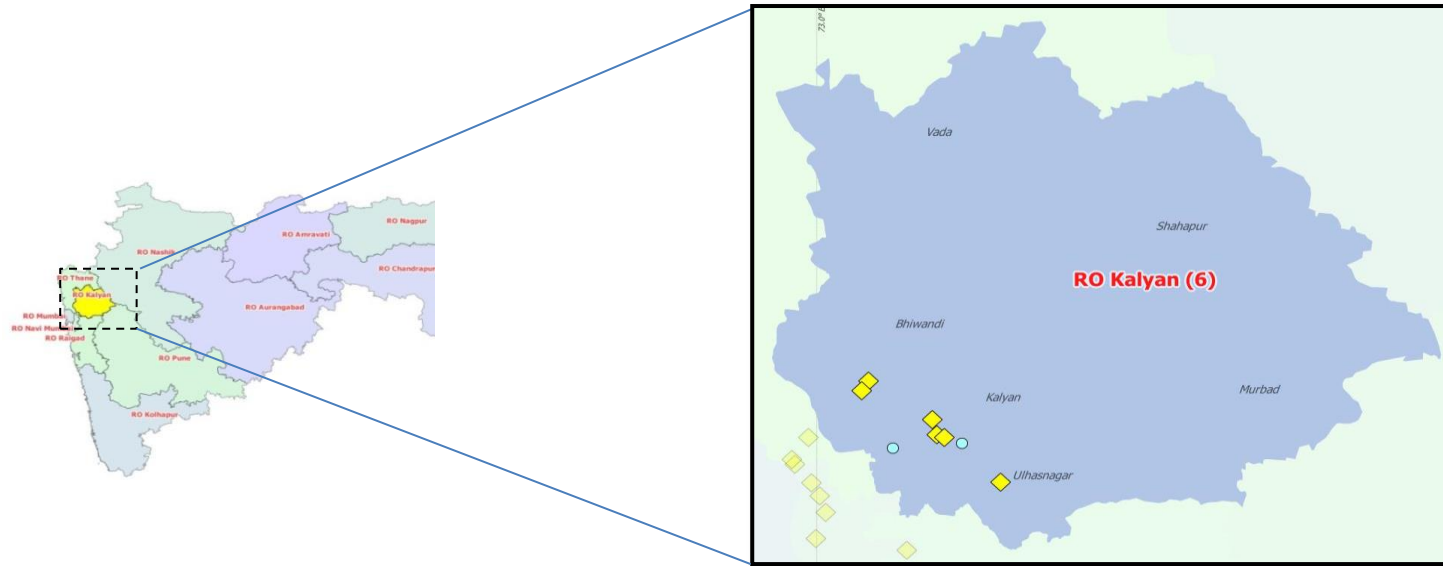


Figure No 64: Annual average trend of SO₂, NO_x and RSPM at Tadali MIDC– Chandrapur

RO – Kalyan



Region	Program	Station Codes	Station	Frequency	Latitude	Longitude
Ambernath	NAMP	1	Ambernath*	Two Days In A Week	19° 13.437'	73° 09.250'
Badlapur	NAMP	649	Badlapur - BIWA House	Two Days In A Week	19° 09.370'	73° 14.267'
Bhiwandi	SAMP	4	I.G.MHospital	Two times in a week	19° 17.954'	73° 4.007'
		5	Premataihall	Two times in a week	19° 17.129'	73° 3.464'
Dombivali	NAMP	6	Dombivali*	Two Days In A Week	19° 12.263'	73° 05.899'
Kalyan	SAMP	7	MPCB Ro Kalyan office	Two times in a week	19° 14.700'	73° 8.976'
Ulhasnagar	NAMP	648	Powai Chowk	Two Days In A Week	19° 13.434'	73° 09.270'
		647	Smt. CHM College Campus	Two Days In A Week	19° 13.206'	73° 09.855'

Ambernath – Ambernath

Table No 62: Data for annual average trend of SO₂, NO_x and RSPM at MIDC Office – Ambernath

Year	N	Annual average (µg/m ³)		
		SO ₂	NO _x	RSPM
<i>Annual Standards</i>		50	40	60
04-05	55	31	36	97
05-06	96	30	52	83
06-07	93	24	44	93
07-08	96	31	40	106
08-09	25	29	53	70
09-10	-	-	-	-
10-11	-	-	-	-
11-12	-	-	-	-

The monitoring station was not operational in the year 2011-12

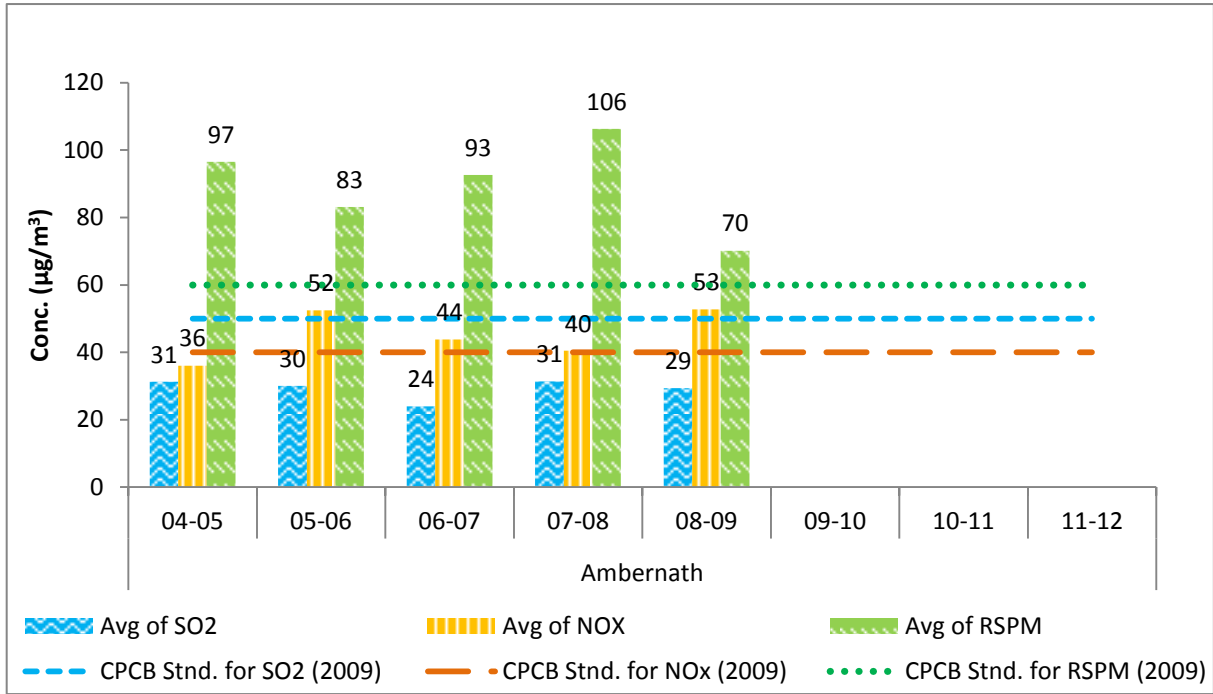


Figure No 65: Annual average trend of SO₂, NO_x and RSPM at Ambernath

Badlapur - BIWA House

Table No 63: Data for monthly average reading recorded at Badlapur - BIWA House

FY	N	Monthly average ($\mu\text{g}/\text{m}^3$)		
		SO ₂	NO _x	RSPM
2011-12				
Apr	8	46	87	173
May	9	9	10	134
Jun	9	24	34	50
Jul	1	25	38	51
Aug	9	21	49	80
Sep	8	18	34	82
Oct	7	40	75	99
Nov	9	39	75	114
Dec	9	70	93	153
Jan	9	60	92	145
Feb	8	73	91	151
Mar	9	52	113	157
Total N		% of exceedence		
95		10.5	46.3	69.5

Table No 64: Data for annual average trend of SO₂, NO_x and RSPM at Badlapur - BIWA House

Year	N	Annual average ($\mu\text{g}/\text{m}^3$)		
		SO ₂	NO _x	RSPM
Annual Standards		50	40	60
04-05	-	-	-	-
05-06	-	-	-	-
06-07	80	27	39	141
07-08	104	30	42	93
08-09	102	35	76	98
09-10	84	55	85	103
10-11	94	36	74	118
11-12	95	41	68	121

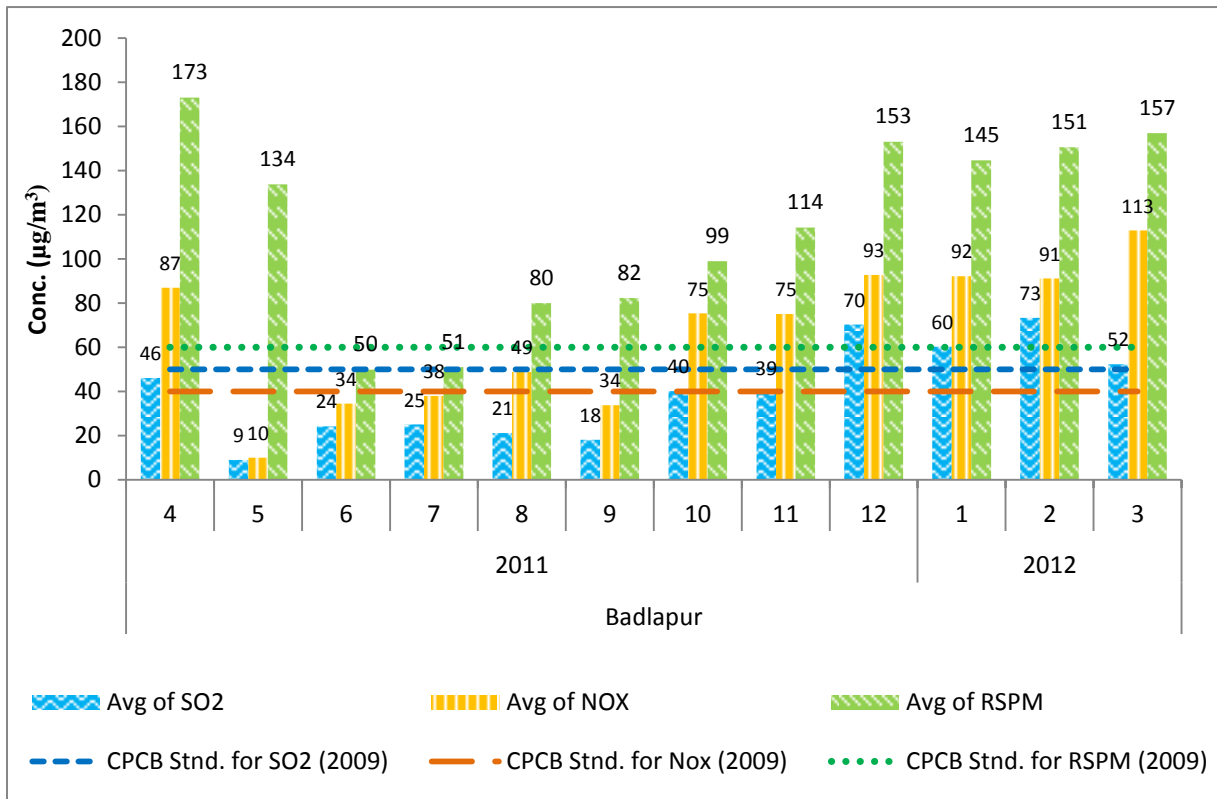


Figure No 66: Monthly average reading recorded at Badlapur - BIWA House

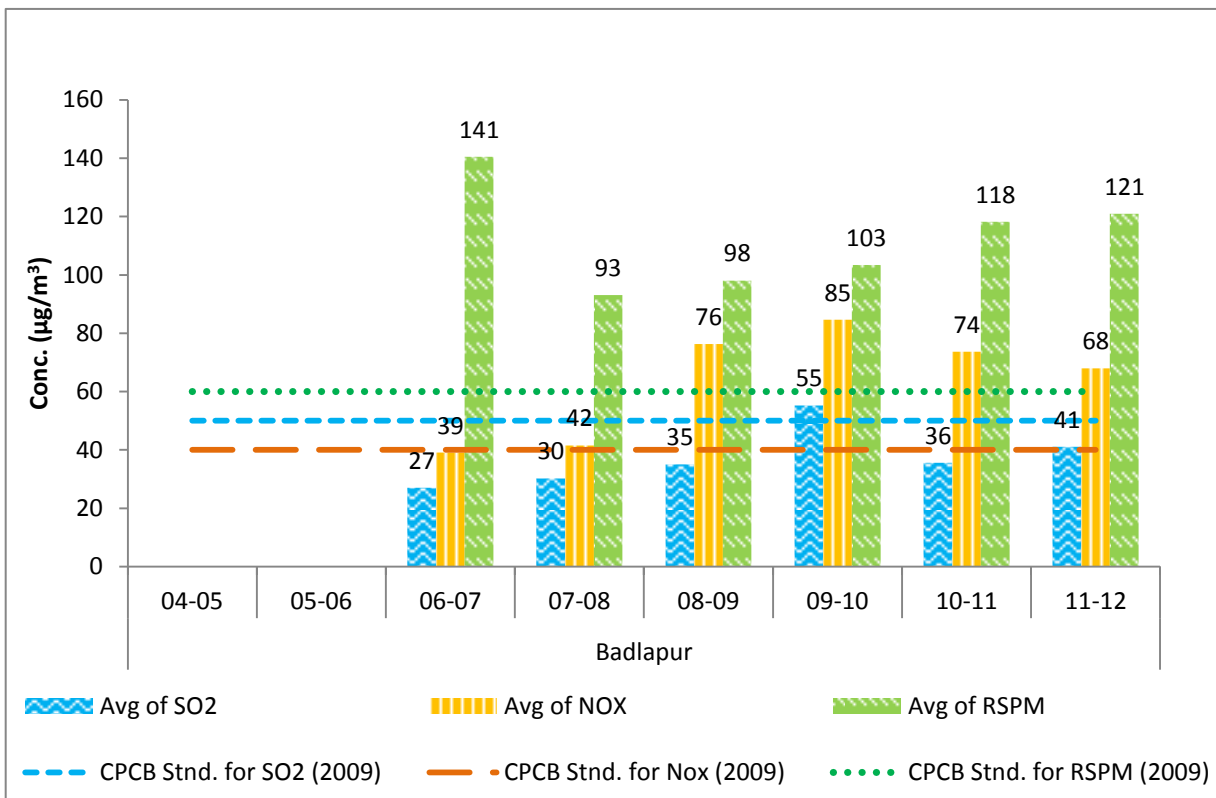


Figure No 67: Annual average trend of SO₂, NO_x and RSPM at Badlapur - BIWA House

Bhiwandi - I.G.M Hospital

Table No 65: Data for monthly average reading recorded at I.G.M Hospital – Bhiwandi

FY	N	Monthly average ($\mu\text{g}/\text{m}^3$)		
		SO ₂	NO _x	RSPM
2011-12				
Apr	-	-	-	-
May	-	-	-	-
Jun	-	-	-	-
Jul	-	-	-	-
Aug	-	-	-	-
Sep	-	-	-	-
Oct	-	-	-	-
Nov	-	-	-	-
Dec	10	23	31	57
Jan	8	22	28	63
Feb	-	-	-	-
Mar	8	23	29	68
	Total N		% of exceedence	
	26	0.0	0.0	0.0

Table No 66: Data for annual average trend of SO₂, NO_x and RSPM at I.G.M Hospital – Bhiwandi

Year	N	Annual average ($\mu\text{g}/\text{m}^3$)		
		SO ₂	NO _x	RSPM
		50	40	60
<i>Annual Standards</i>				
04-05	-	-	-	-
05-06	-	-	-	-
06-07	-	-	-	-
07-08	-	-	-	-
08-09	-	-	-	-
09-10	-	-	-	-
10-11	-	-	-	-
11-12	26	23	29	62

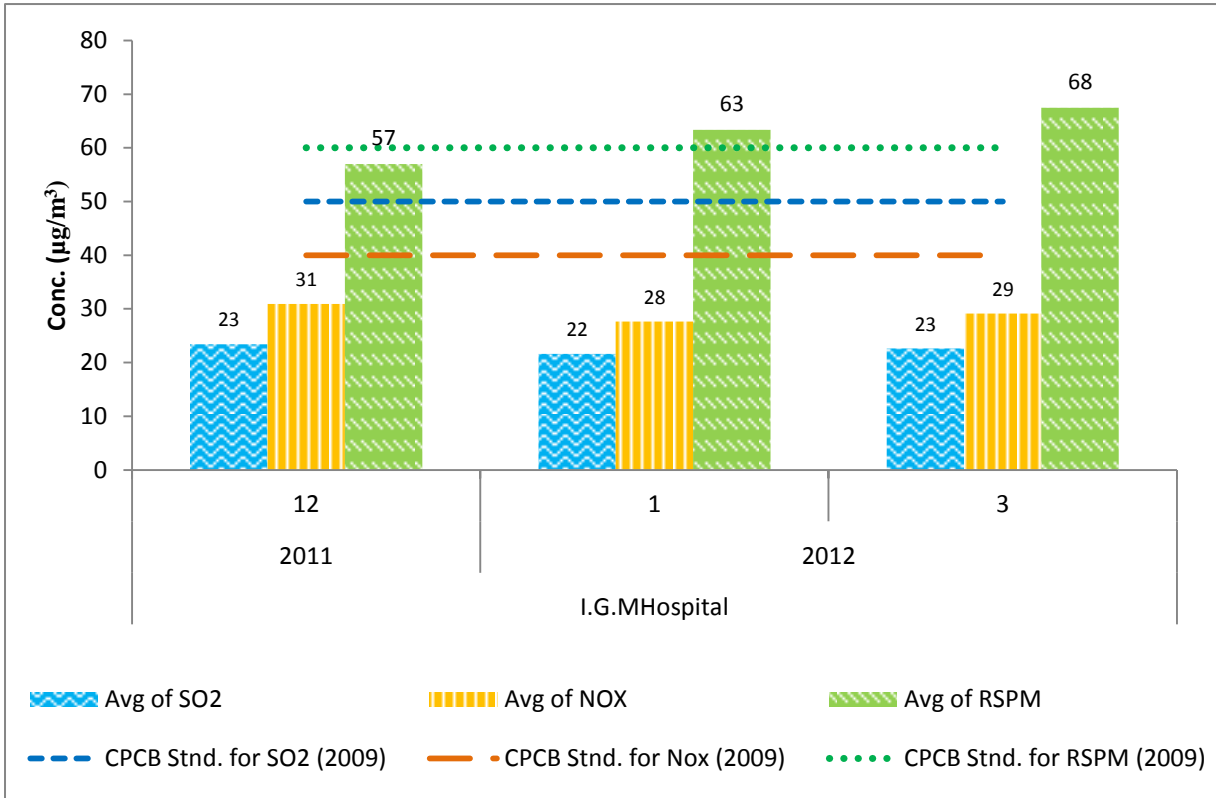


Figure No 68: Monthly average reading recorded at I.G.M Hospital – Bhiwandi

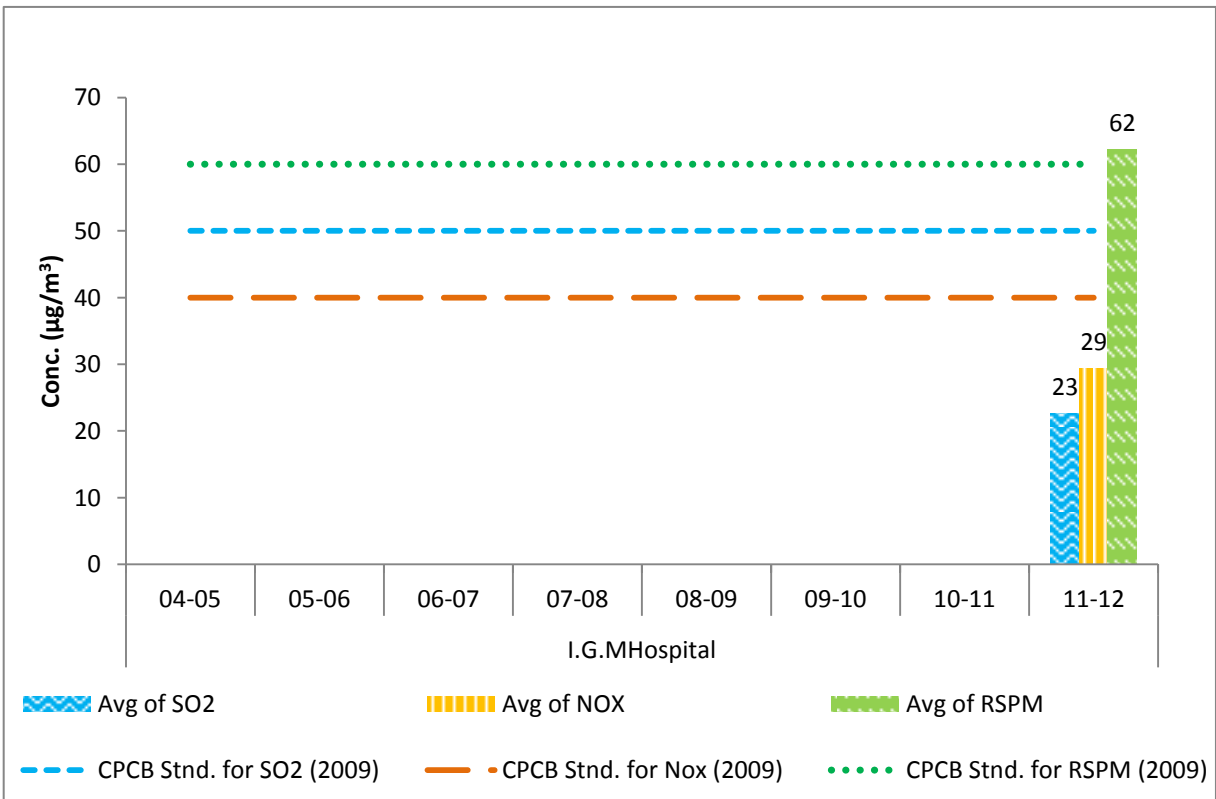


Figure No 69: Annual average trend of SO₂, NO_x and RSPM at I.G.M Hospital – Bhiwandi

Bhiwandi - Prematai hall

Table No 67: Data for monthly average reading recorded at Prematai hall – Bhiwandi

FY	N	Monthly average ($\mu\text{g}/\text{m}^3$)		
		SO ₂	NO _x	RSPM
2011-12				
Apr	9	27	25	64
May	9	9	29	62
Jun	8	12	18	49
Jul	9	11	19	52
Aug	8	12	26	35
Sep	8	16	24	62
Oct	10	15	24	54
Nov	10	15	22	53
Dec	8	15	26	47
Jan	8	15	22	46
Feb	8	17	24	47
Mar	8	17	24	49
	Total N		% of exceedence	
	103	0.0	0.0	0.0

Table No 68: Data for annual average trend of SO₂, NO_x and RSPM at Prematai hall – Bhiwandi

Year	N	Annual average ($\mu\text{g}/\text{m}^3$)		
		SO ₂	NO _x	RSPM
<i>Annual Standards</i>		50	40	60
04-05	-	-	-	-
05-06	-	-	-	-
06-07	-	-	-	-
07-08	-	-	-	-
08-09	-	-	-	-
09-10	-	-	-	-
10-11	-	-	-	-
11-12	103	15	23	52

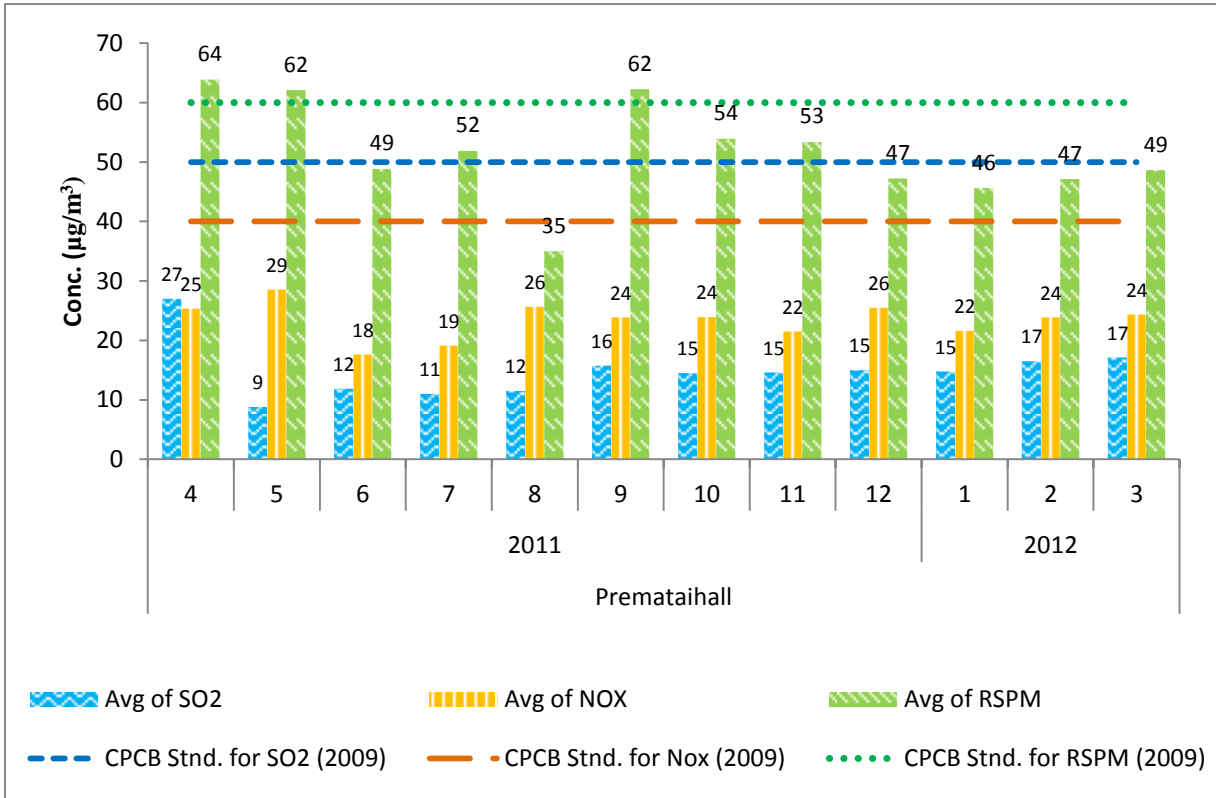


Figure No 70: Monthly average reading recorded at Prematai hall – Bhiwandi

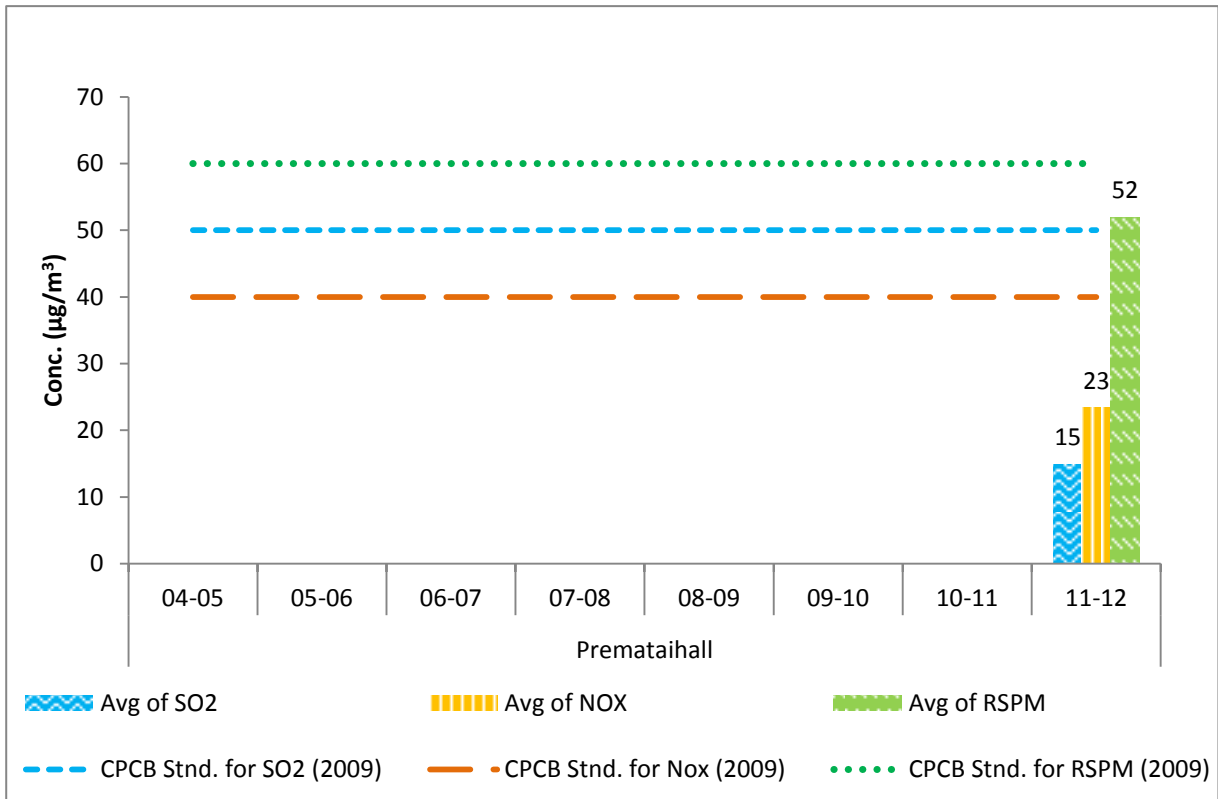


Figure No 71: Annual average trend of SO₂, NO_x and RSPM at Prematai hall – Bhiwandi

Dombivali – MIDC office Dombivali

Table No 69: Data for annual average trend of SO₂, NO_x and RSPM at MIDC Office – Dombivali

Year	N	Annual average (µg/m ³)		
		SO ₂	NO _x	RSPM
<i>Annual Standards</i>		50	40	60
04-05	55	42	38	71
05-06	96	35	52	109
06-07	93	24	38	120
07-08	96	37	41	98
08-09	25	34	55	68
09-10	-	-	-	-
10-11	-	-	-	-
11-12	-	-	-	-
12-13		50	94	123

The monitoring station was not operational in the year 2011-12

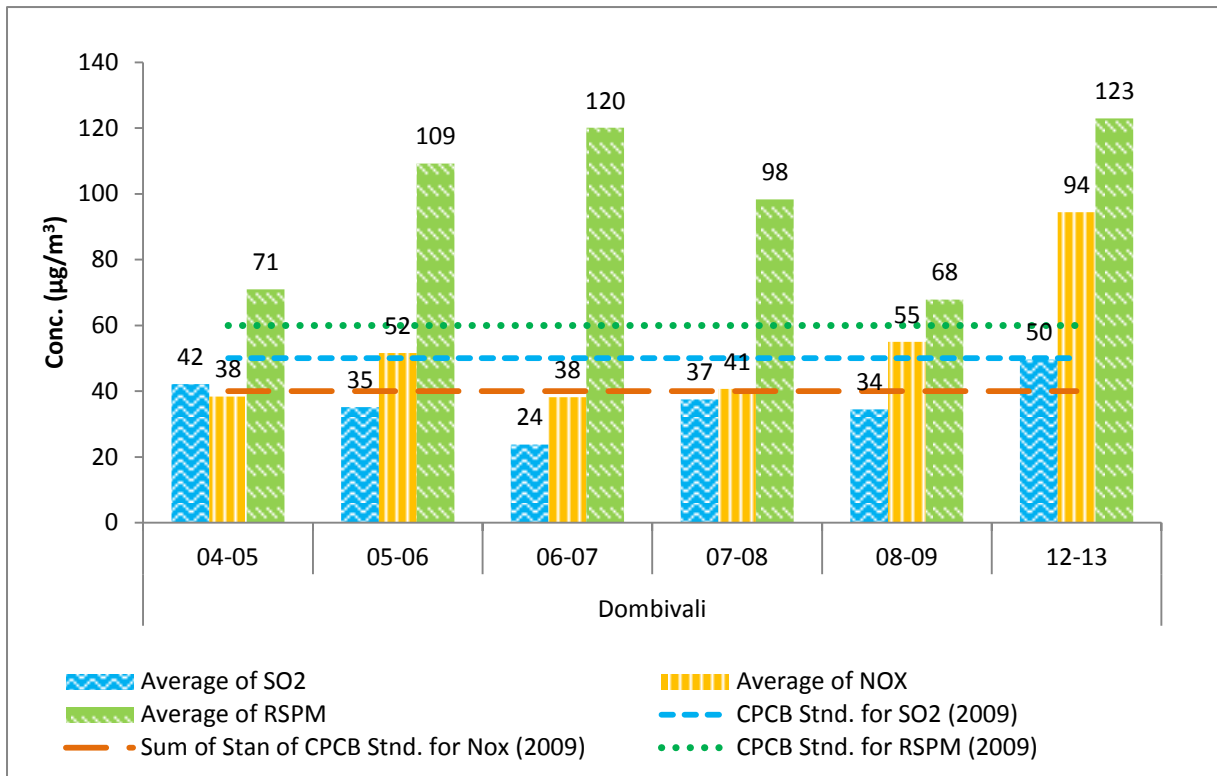


Figure No 72: Annual average trend of SO₂, NO_x and RSPM at MIDC Office Dombivali

Kalyan - MPCB RO Kalyan Office

Table No 70: Data for monthly average reading recorded at MPCB RO Kalyan Office – Kalyan

FY	N	Monthly average ($\mu\text{g}/\text{m}^3$)		
		SO ₂	NO _x	RSPM
2011-12				
Apr	8	13	32	62
May	8	7	41	59
Jun	8	24	25	84
Jul	-	-	-	-
Aug	8	21	31	71
Sep	8	20	35	75
Oct	7	24	39	73
Nov	8	24	33	75
Dec	9	31	36	74
Jan	9	24	33	67
Feb	-	-	-	-
Mar	9	25	33	72
	Total N		% of exceedence	
	82	0.0	0.0	1.2

Table No 71: Data for annual average trend of SO₂, NO_x and RSPM at MPCB RO Kalyan Office - Kalyan

Year	N	Annual average ($\mu\text{g}/\text{m}^3$)		
		SO ₂	NO _x	RSPM
<i>Annual Standards</i>		50	40	60
04-05	-	-	-	-
05-06	-	-	-	-
06-07	-	-	-	-
07-08	-	-	-	-
08-09	-	-	-	-
09-10	-	-	-	-
10-11	-	-	-	-
11-12	82	22	34	71

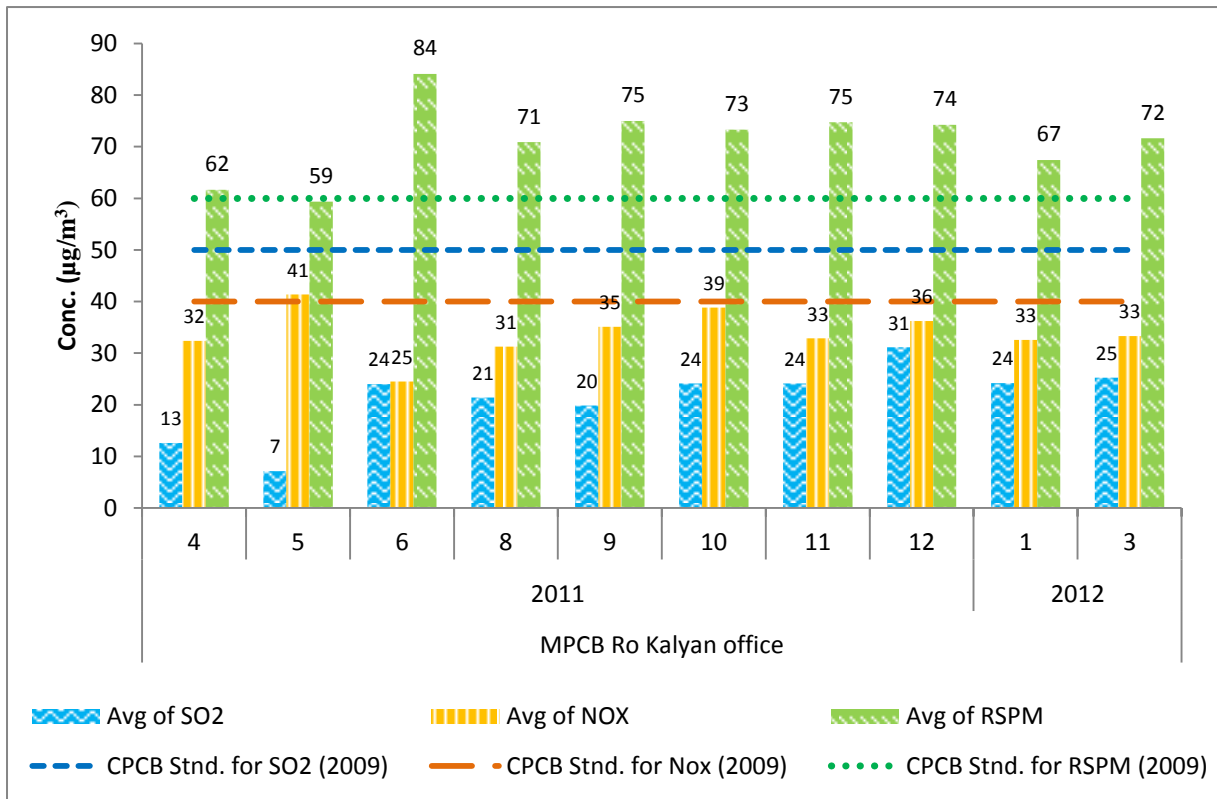


Figure No 73: Monthly average reading recorded at MPCB RO Kalyan Office – Kalyan

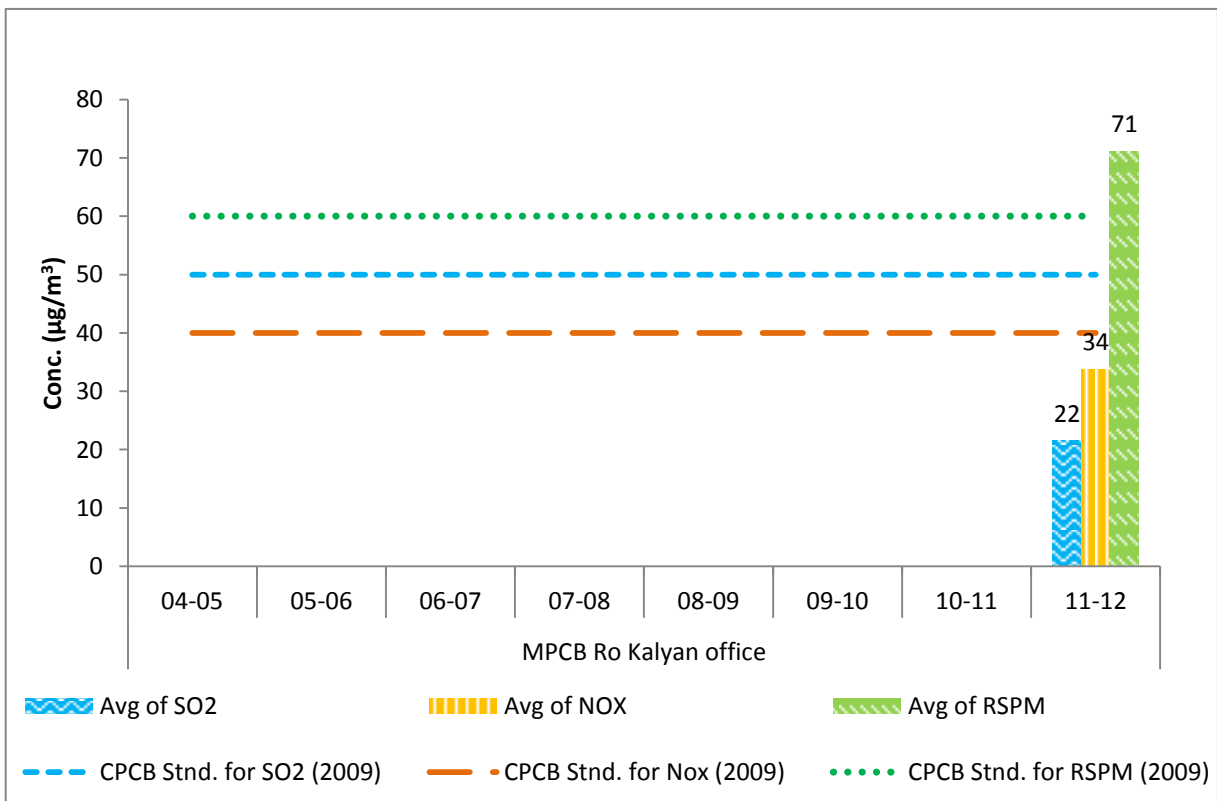


Figure No 74: Annual average trend of SO₂, NO_x and RSPM at MPCB RO Kalyan Office - Kalyan

Ulhasnagar - Powai Chowk

Table No 72: Data for monthly average reading recorded at Powai Chowk – Ulhasnagar

FY	N	Monthly average ($\mu\text{g}/\text{m}^3$)		
		SO ₂	NO _x	RSPM
2011-12				
Apr	8	41	99	196
May	8	56	84	168
Jun	9	30	45	60
Jul	9	36	66	83
Aug	9	27	52	79
Sep	8	20	36	82
Oct	8	33	66	123
Nov	9	37	70	107
Dec	8	60	95	157
Jan	9	71	100	150
Feb	9	54	95	156
Mar	8	56	83	118
Total N		% of exceedence		
102		5.9	52.0	61.8

Table No 73: Data for annual average trend of SO₂, NO_x and RSPM at Powai Chowk – Ulhasnagar

Year	N	Annual average ($\mu\text{g}/\text{m}^3$)		
		SO ₂	NO _x	RSPM
Annual Standards		50	40	60
04-05	-	-	-	-
05-06	-	-	-	-
06-07	89	24	38	121
07-08	98	25	37	91
08-09	98	33	69	95
09-10	89	53	96	119
10-11	96	31	69	114
11-12	102	43	74	122

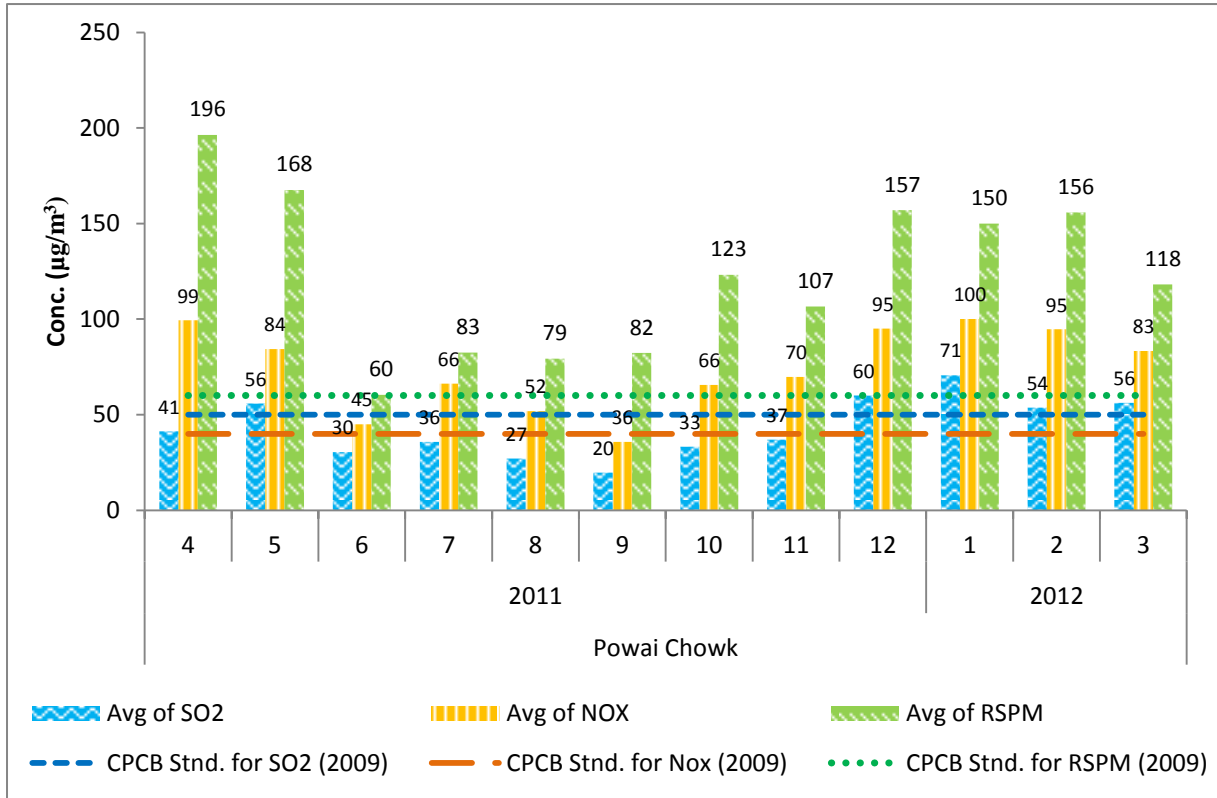


Figure No 75: Monthly average reading recorded at Powai Chowk – Ulhasnagar

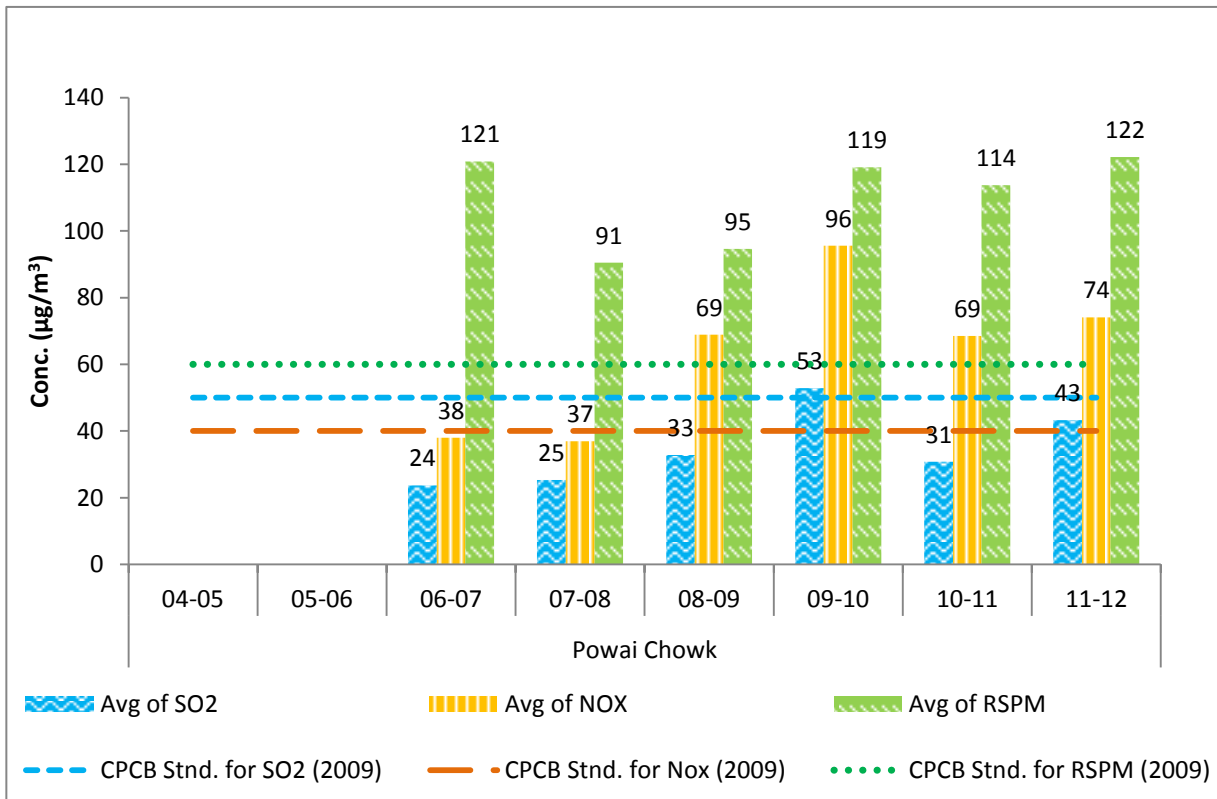


Figure No 76: Annual average trend of SO₂, NO_x and RSPM at Powai Chowk – Ulhasnagar

Ulhasnagar - CHM College Campus

Table No 74: Data for monthly average reading recorded at Smt. CHM College Campus – Ulhasnagar

FY	N	Monthly average ($\mu\text{g}/\text{m}^3$)		
		SO ₂	NO _x	RSPM
2011-12				
Apr	8	48	80	157
May	9	49	74	147
Jun	8	28	49	65
Jul	8	31	55	70
Aug	10	20	40	81
Sep	8	17	28	81
Oct	8	29	60	91
Nov	9	31	60	93
Dec	8	45	77	126
Jan	9	58	80	125
Feb	9	45	75	123
Mar	8	41	94	150
	Total N		% of exceedence	
	102	2.0	21.6	58.8

Table No 75: Data for annual average trend of SO₂, NO_x and RSPM at Smt. CHM College Campus – Ulhasnagar

Year	N	Annual average ($\mu\text{g}/\text{m}^3$)		
		SO ₂	NO _x	RSPM
<i>Annual Standards</i>		50	40	60
04-05	-	-	-	-
05-06	-	-	-	-
06-07	75	28	46	159
07-08	53	31	42	90
08-09	92	30	57	87
09-10	88	46	70	92
10-11	99	30	61	99
11-12	102	37	64	109

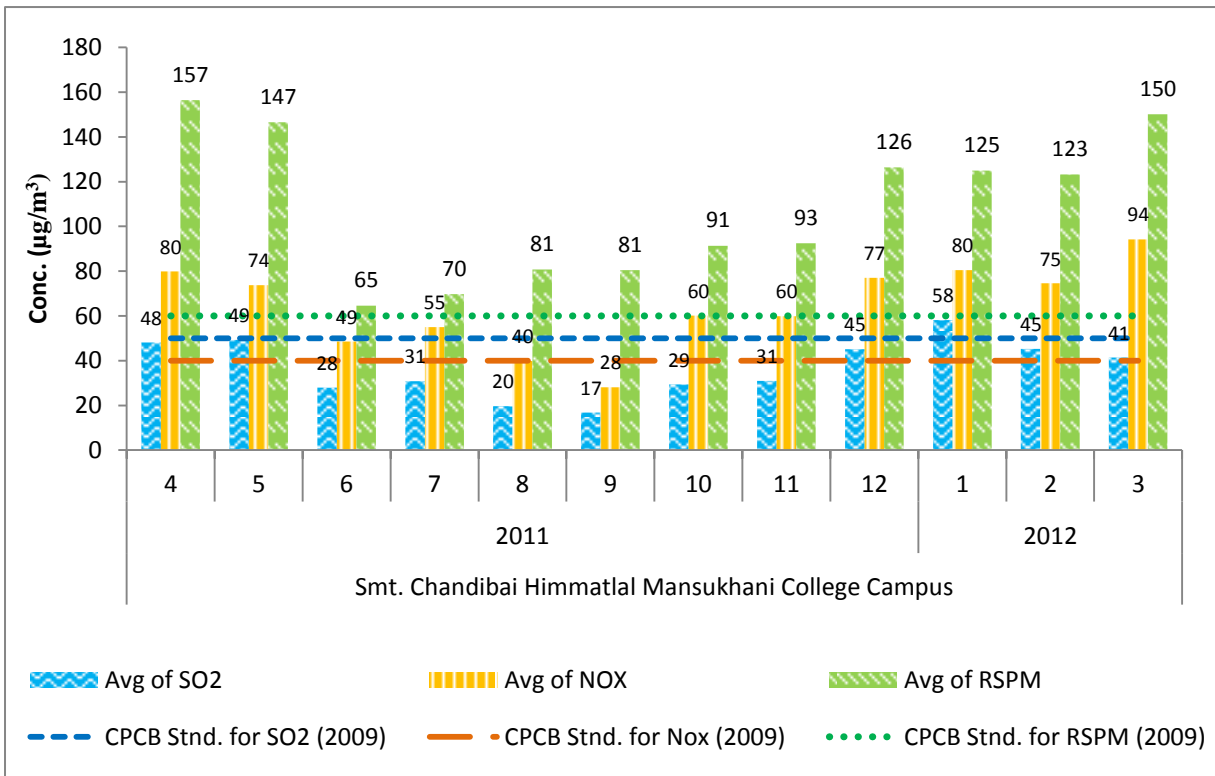


Figure No 77: Monthly average reading recorded at Smt. CHM College Campus – Ulhasnagar

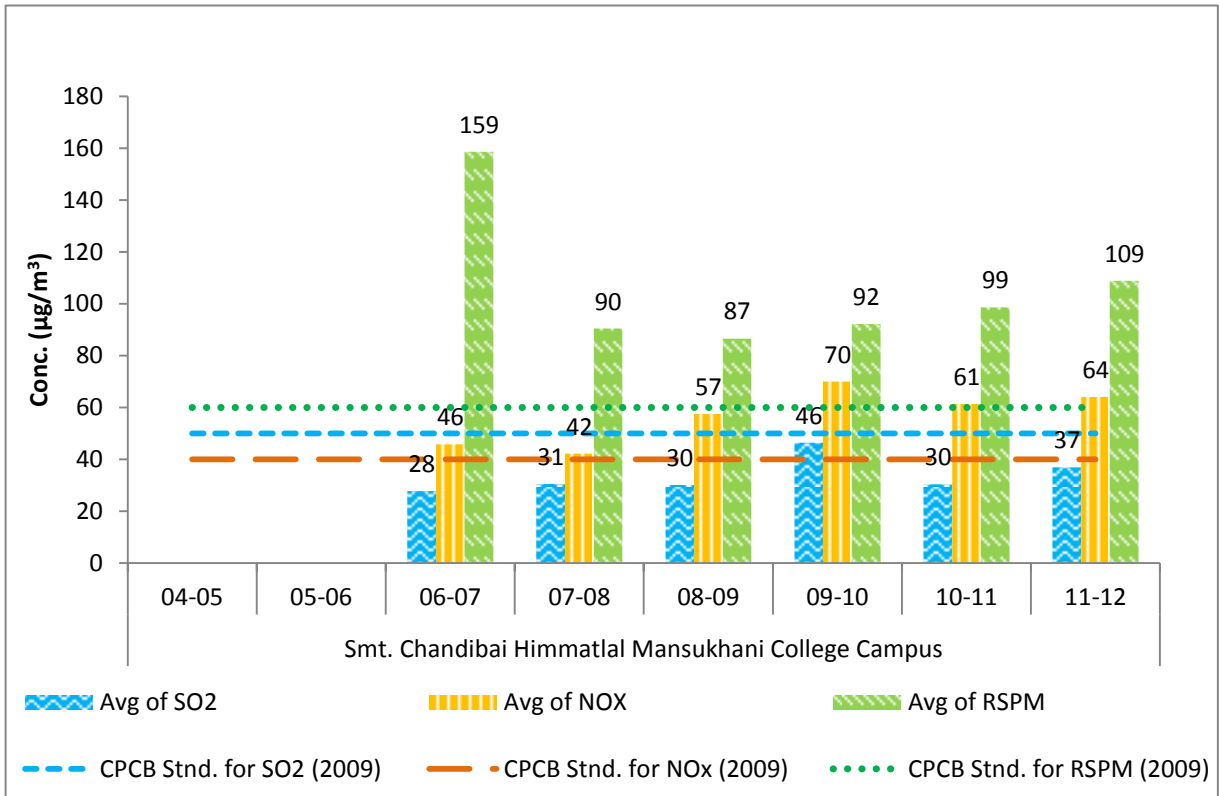
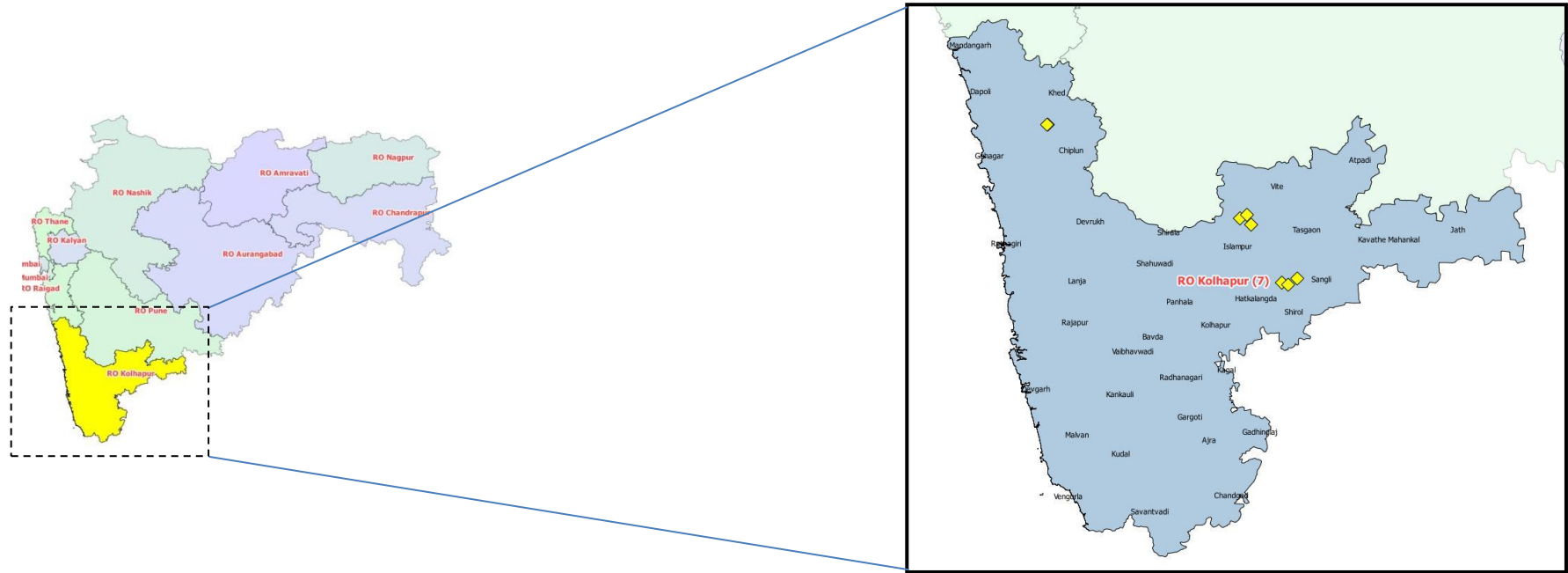


Figure No 78: Annual average trend of SO₂, NO_x and RSPM at Smt. CHM College Campus – Ulhasnagar

RO – Kolhapur



Region	Program name	Station Codes	Station	Frequency	Latitude	Longitude
Chiplun	NAMP	489	MIDC Chalkewadi	Two Days In A Week	17° 35.280'	73° 29.417'
		490	Chiplun - Water Treatment	Two Days In A Week	17° 35.253'	73° 29.229'
Kolhapur	NAMP	510	Mahadwar Road	Two Days In A Week	16° 69.450'	74° 22.176'
		509	Ruikar Trust	Two Days In A Week	16° 70.423'	74° 24.169'
		508	Shivaji University Campus	Two Days In A Week	16° 67.669'	74° 25.282'
Sangli	NAMP	576	Krishna Valley school	Twice a week	16° 52.824'	74° 38.038'
		575	Sangli-Miraj Primary Municipal school	Twice a week	16° 51.656''	74° 33.875'
		574	Terrace of SRO-Sangli, Udyog Bhavan	Twice a week	16° 51.197'	74° 35.481'

MIDC Chalkewadi

Table No 76: Data for monthly average reading recorded at MIDC Chalkewadi – Chiplun

FY	N	Monthly average ($\mu\text{g}/\text{m}^3$)		
		SO ₂	NO _x	RSPM
2011-12				
Apr	-	-	-	-
May	-	-	-	-
Jun	-	-	-	-
Jul	-	-	-	-
Aug	-	-	-	-
Sep	-	-	-	-
Oct	-	-	-	-
Nov	8	25	16	35
Dec	7	23	14	44
Jan	9	24	14	36
Feb	-	-	-	-
Mar	-	-	-	-
	Total N		% of exceedence	
	24	0.0	0.0	0.0

Table No 77: Data for annual average trend of SO₂, NO_x and RSPM at MIDC Chalkewadi – Chiplun

Year	N	Annual average ($\mu\text{g}/\text{m}^3$)		
		SO ₂	NO _x	RSPM
<i>Annual Standards</i>		50	40	60
04-05	-	-	-	-
05-06	-	-	-	-
06-07	43	12	11	85
07-08	83	23	28	87
08-09	26	25	24	62
09-10	-	-	-	-
10-11	36	59	33	144
11-12	24	24	15	38

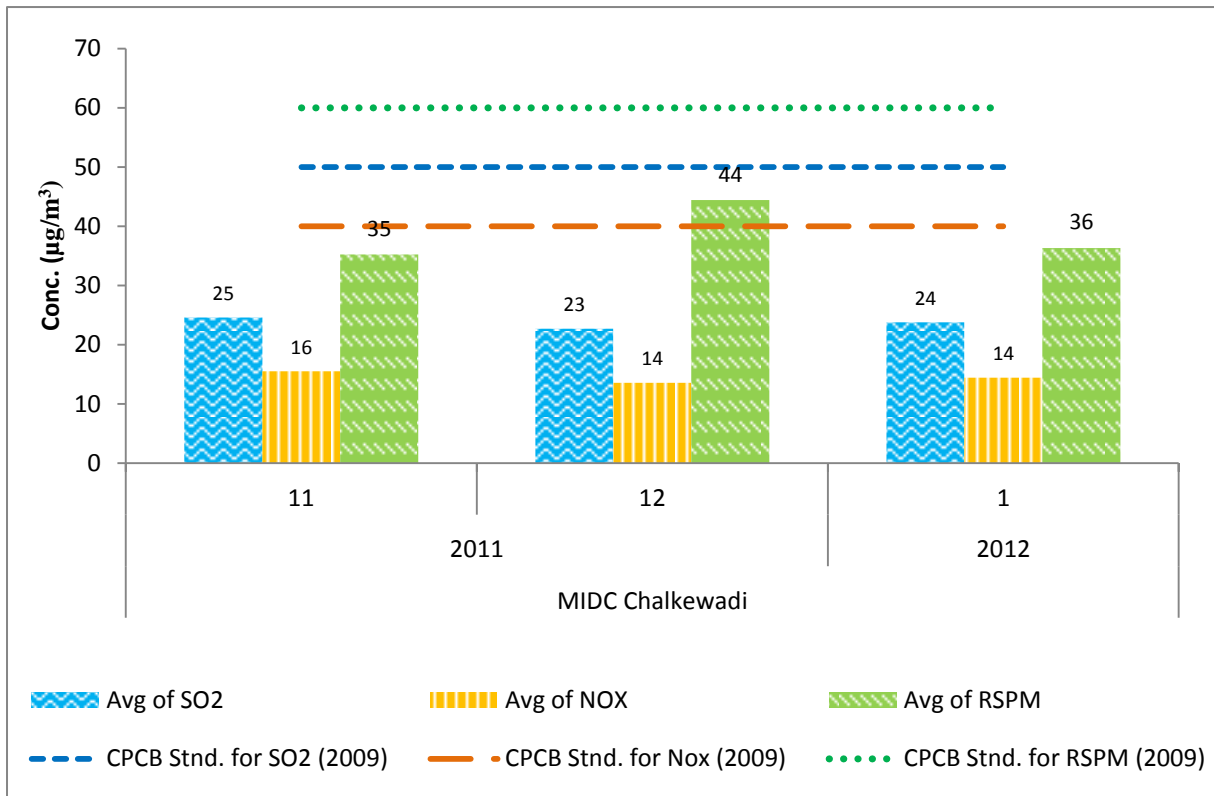


Figure No 79: Monthly average reading recorded at MIDC Chalkewadi – Chiplun

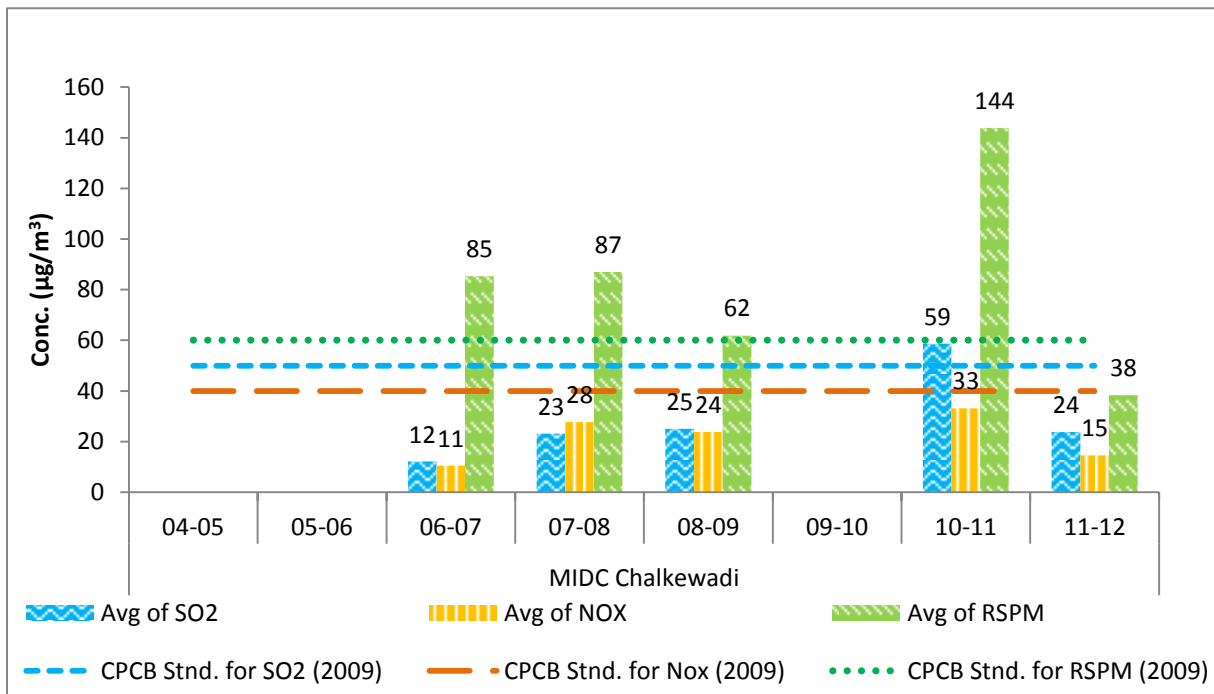


Figure No 80: Annual average trend of SO₂, NO_x and RSPM at MIDC Chalkewadi – Chiplun

Chiplun - Water Treatment

Table No 78: Data for monthly average reading recorded at Chiplun - Water Treatment

FY	N	Monthly average ($\mu\text{g}/\text{m}^3$)		
		SO ₂	NO _x	RSPM
2011-12				
Apr	1	46	33	153
May	-	-	-	-
Jun	-	-	-	-
Jul	-	-	-	-
Aug	-	-	-	-
Sep	-	-	-	-
Oct	7	20	14	47
Nov	9	25	16	30
Dec	7	25	14	48
Jan	9	26	14	43
Feb	-	-	-	-
Mar	-	-	-	-
	Total N		% of exceedence	
	33	0.0	0.0	6.1

Table No 79: Data for annual average trend of SO₂, NO_x and RSPM at Chiplun - Water Treatment

Year	N	Annual average ($\mu\text{g}/\text{m}^3$)		
		SO ₂	NO _x	RSPM
		50	40	60
<i>Annual Standards</i>				
04-05	-	-	-	-
05-06	2	21	0	54
06-07	105	32	10	67
07-08	105	20	23	73
08-09	25	25	22	44
09-10	-	-	-	-
10-11	44	54	31	129
11-12	33	25	15	45

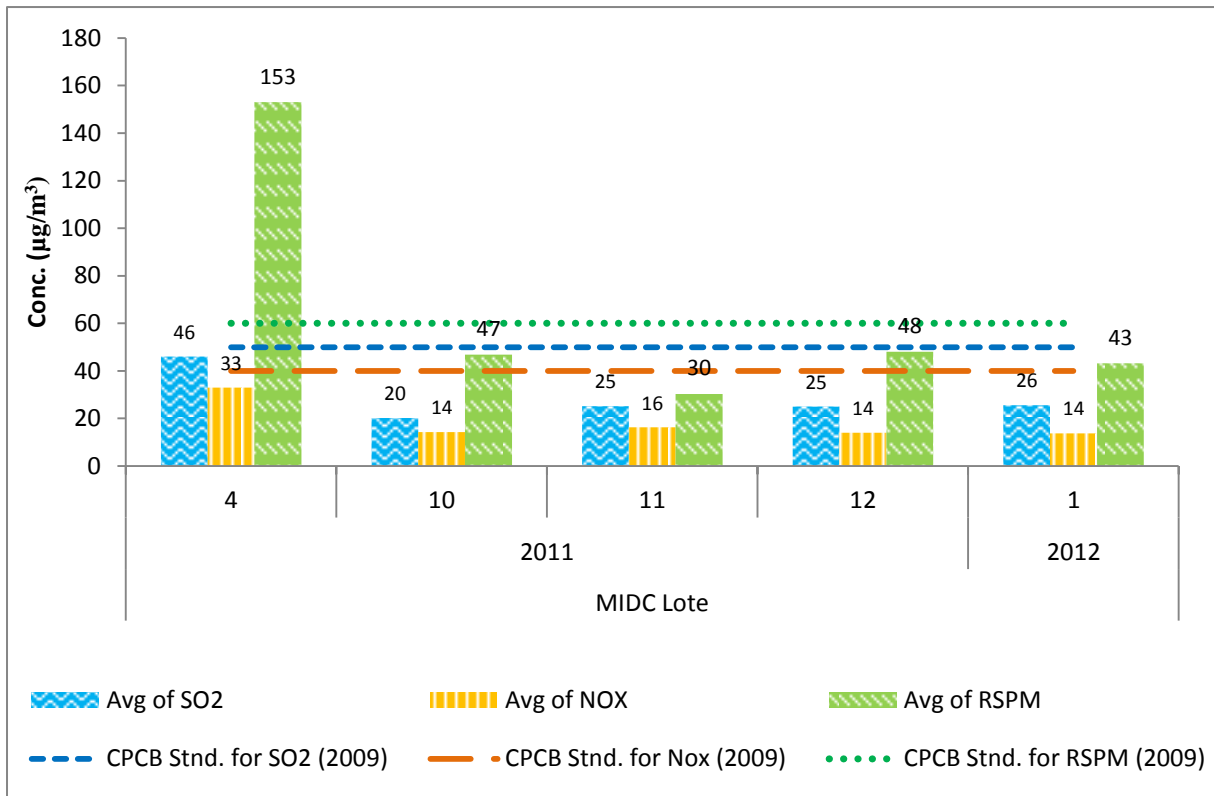


Figure No 81: Monthly average reading recorded at Chiplun - Water Treatment

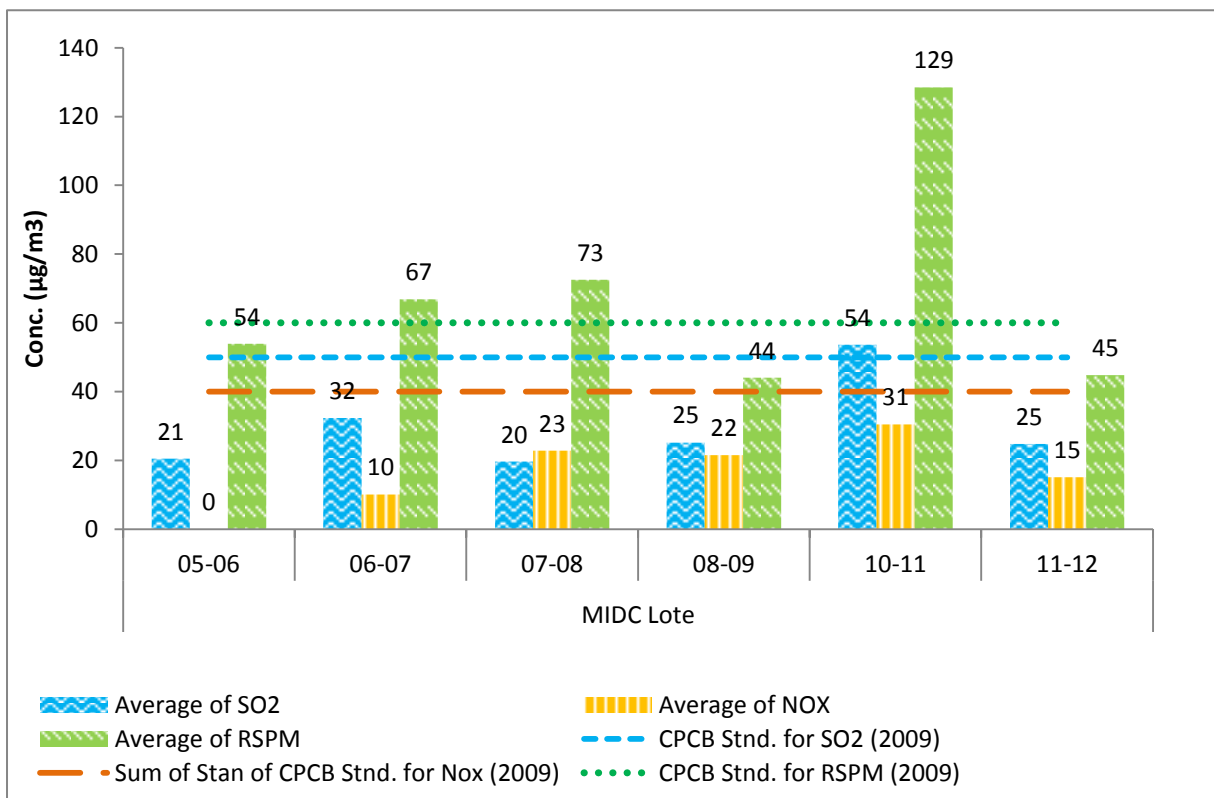


Figure No 82: Annual average trend of SO₂, NO_x and RSPM at Chiplun - Water Treatment

Kolhapur – Mahadwar Road

Table No 80: Data for monthly average reading recorded at Mahadwar Road – Kolhapur

FY	N	Monthly average ($\mu\text{g}/\text{m}^3$)		
		SO ₂	NO _x	RSPM
2011-12				
Apr	9	21	24	101
May	-	-	-	-
Jun	9	13	17	78
Jul	9	18	24	81
Aug	9	14	20	68
Sep	8	16	21	79
Oct	9	21	24	101
Nov	9	22	26	109
Dec	9	22	28	112
Jan	8	24	33	125
Feb	9	25	33	129
Mar	9	26	34	137
	Total N		% of exceedence	
	97	0.0	0.0	56.7

Table No 81: Data for annual average trend of SO₂, NO_x and RSPM at Mahadwar Road – Kolhapur

Year	N	Annual average ($\mu\text{g}/\text{m}^3$)		
		SO ₂	NO _x	RSPM
		50	40	60
<i>Annual Standards</i>				
04-05	-	-	-	-
05-06	79	8	28	69
06-07	99	8	21	64
07-08	91	8	11	75
08-09	100	12	17	84
09-10	103	13	15	86
10-11	104	17	21	92
11-12	97	20	26	102

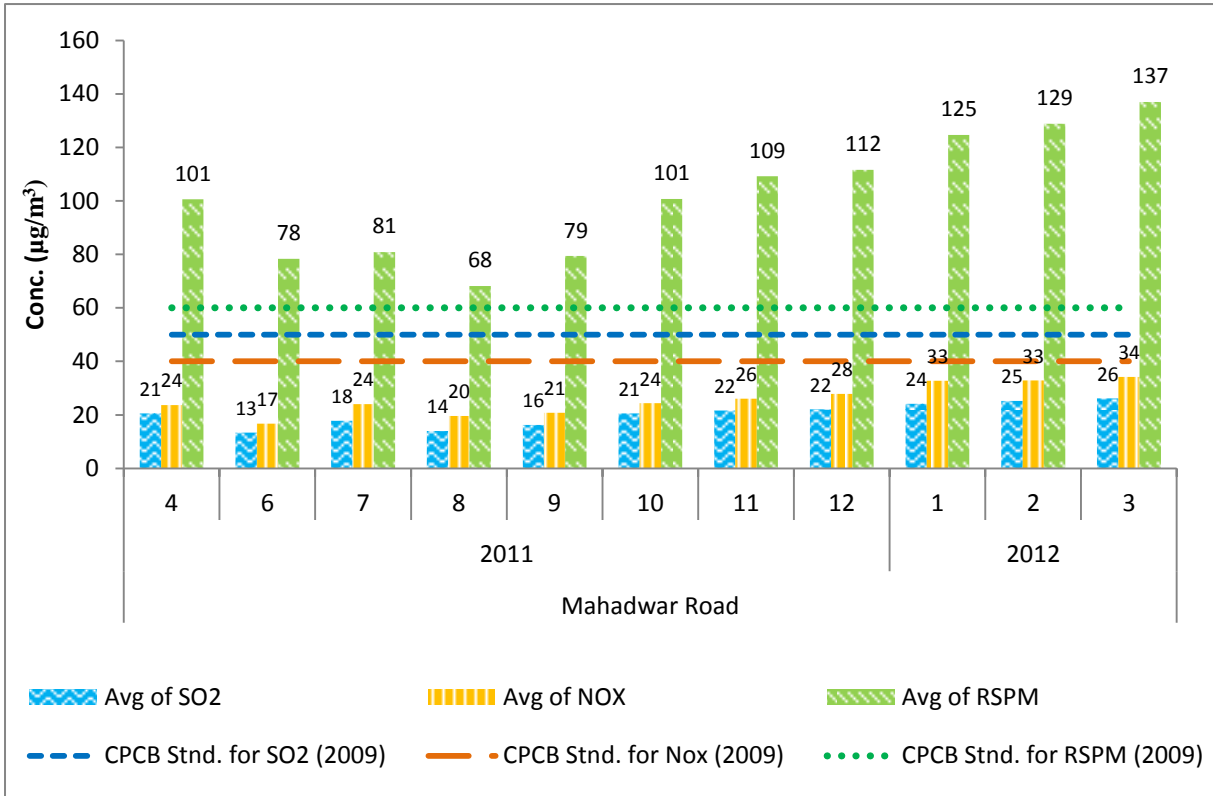


Figure No 83: Monthly average reading recorded at Mahadwar Road – Kolhapur

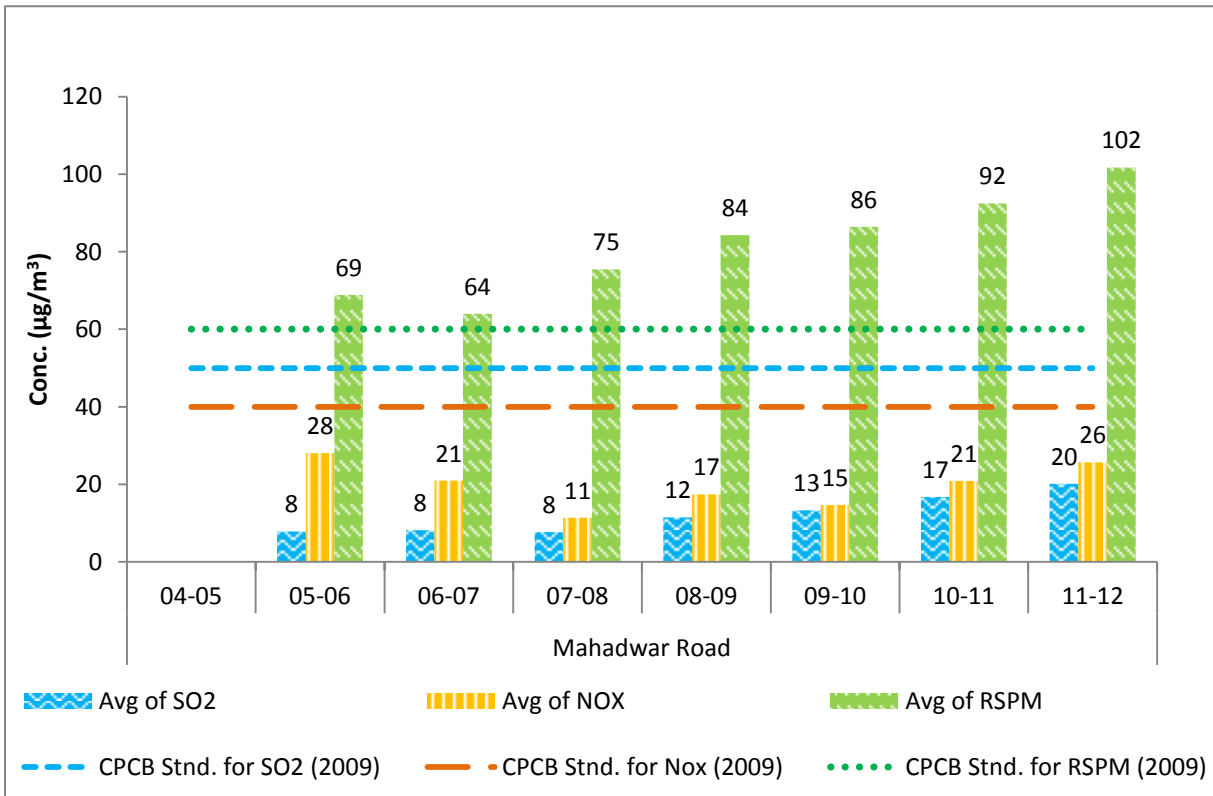


Figure No 84: Annual average trend of SO₂, NO_x and RSPM at Mahadwar Road – Kolhapur

Kolhapur – Raikar Trust

Table No 82: Data for monthly average reading recorded at Raikar Trust – Kolhapur

FY	N	Monthly average ($\mu\text{g}/\text{m}^3$)		
		SO ₂	NO _x	RSPM
2011-12				
Apr	9	24	32	113
May	9	27	38	132
Jun	8	17	23	88
Jul	9	18	24	81
Aug	9	20	27	78
Sep	9	21	28	90
Oct	8	25	32	113
Nov	9	26	35	123
Dec	9	26	36	126
Jan	9	27	42	142
Feb	8	28	42	148
Mar	9	28	43	159
Total N		% of exceedence		
105		0.0	0.0	66.7

Table No 83: Data for annual average trend of SO₂, NO_x and RSPM at Raikar Trust – Kolhapur

Year	N	Annual average ($\mu\text{g}/\text{m}^3$)		
		SO ₂	NO _x	RSPM
Annual Standards		50	40	60
04-05	-	-	-	-
05-06	84	12	45	108
06-07	101	11	39	96
07-08	103	10	27	95
08-09	102	16	27	100
09-10	92	16	20	99
10-11	102	21	27	105
11-12	105	24	33	116

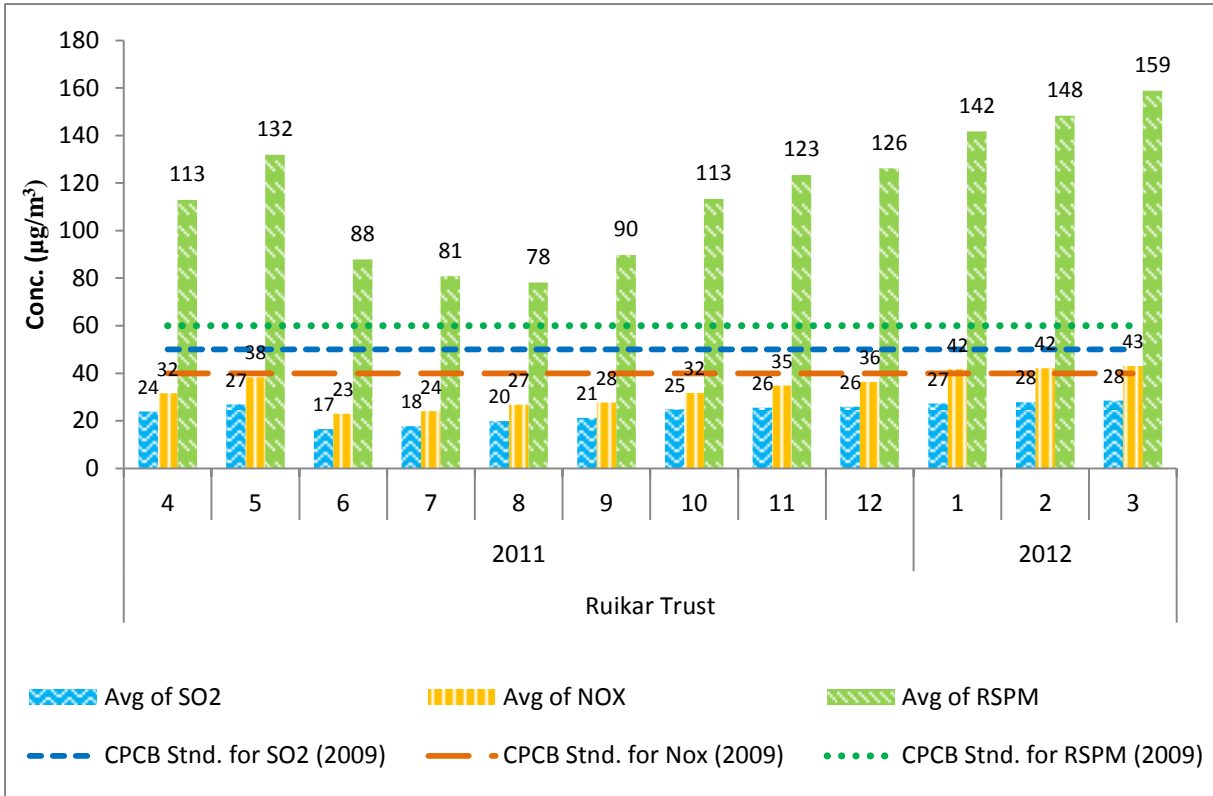


Figure No 85: Monthly average reading recorded at Ruikar Trust – Kolhapur

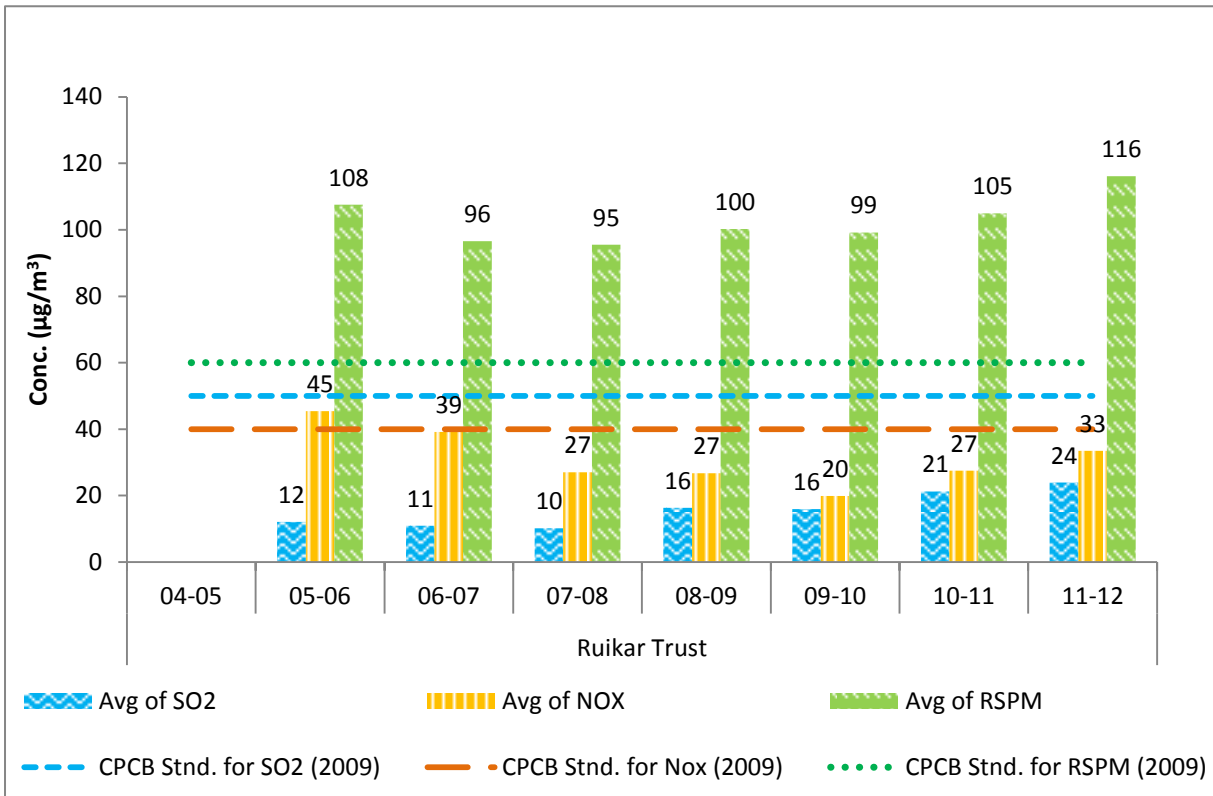


Figure No 86: Annual average trend of SO₂, NO_x and RSPM at Ruikar Trust – Kolhapur

Kolhapur - Shivaji University Campus

Table No 84: Data for monthly average reading recorded at Shivaji University Campus – Kolhapur

FY	N	Monthly average ($\mu\text{g}/\text{m}^3$)		
		SO ₂	NO _x	RSPM
2011-12				
Apr	8	9	11	64
May	9	9	12	66
Jun	9	8	10	50
Jul	17	13	17	65
Aug	9	7	5	45
Sep	9	8	8	53
Oct	9	9	12	67
Nov	8	10	13	61
Dec	9	10	14	59
Jan	9	10	17	66
Feb	8	11	17	63
Mar	9	11	17	61
Total N		% of exceedence		
113		0.0	0.0	0.0

Table No 85: Data for annual average trend of SO₂, NO_x and RSPM at Shivaji University Campus – Kolhapur

Year	N	Annual average ($\mu\text{g}/\text{m}^3$)		
		SO ₂	NO _x	RSPM
<i>Annual Standards</i>		50	40	60
04-05	-	-	-	-
05-06	88	4	7	40
06-07	101	5	7	44
07-08	104	5	3	46
08-09	80	8	10	62
09-10	96	8	4	55
10-11	104	9	9	56
11-12	113	10	13	60

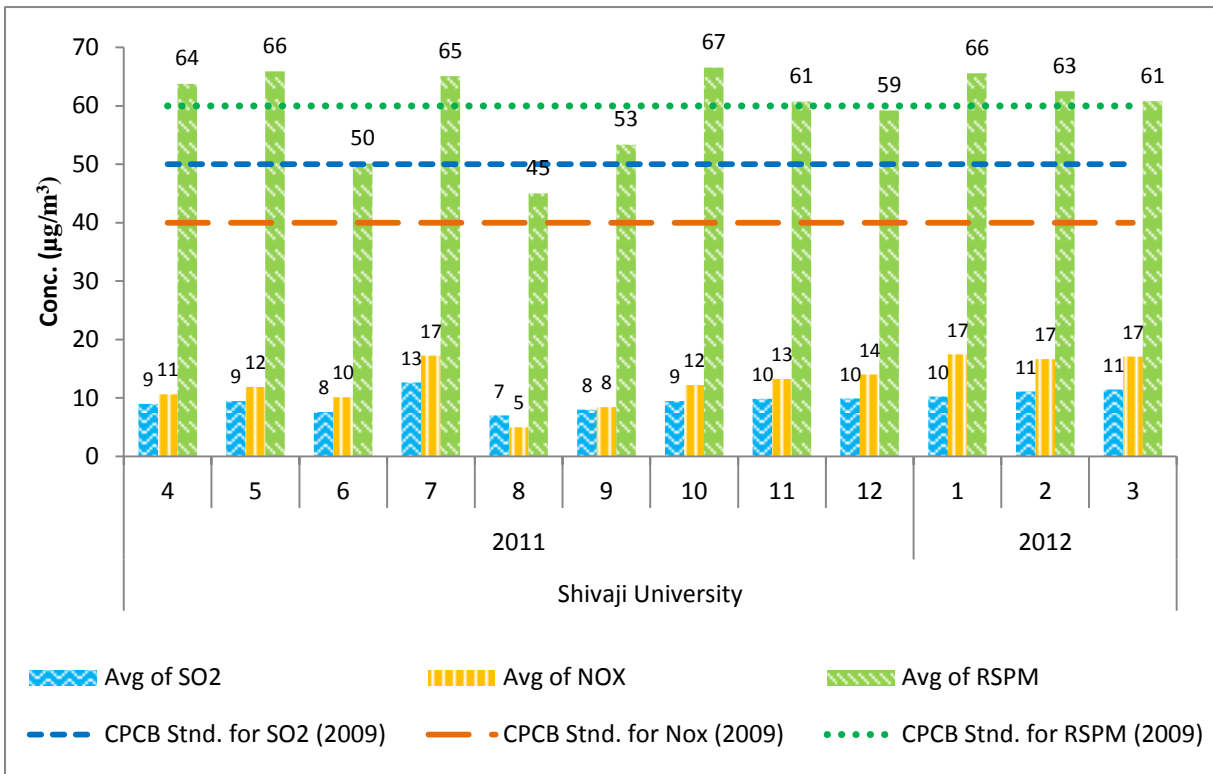


Figure No 87: Monthly average reading recorded at Shivaji University Campus – Kolhapur

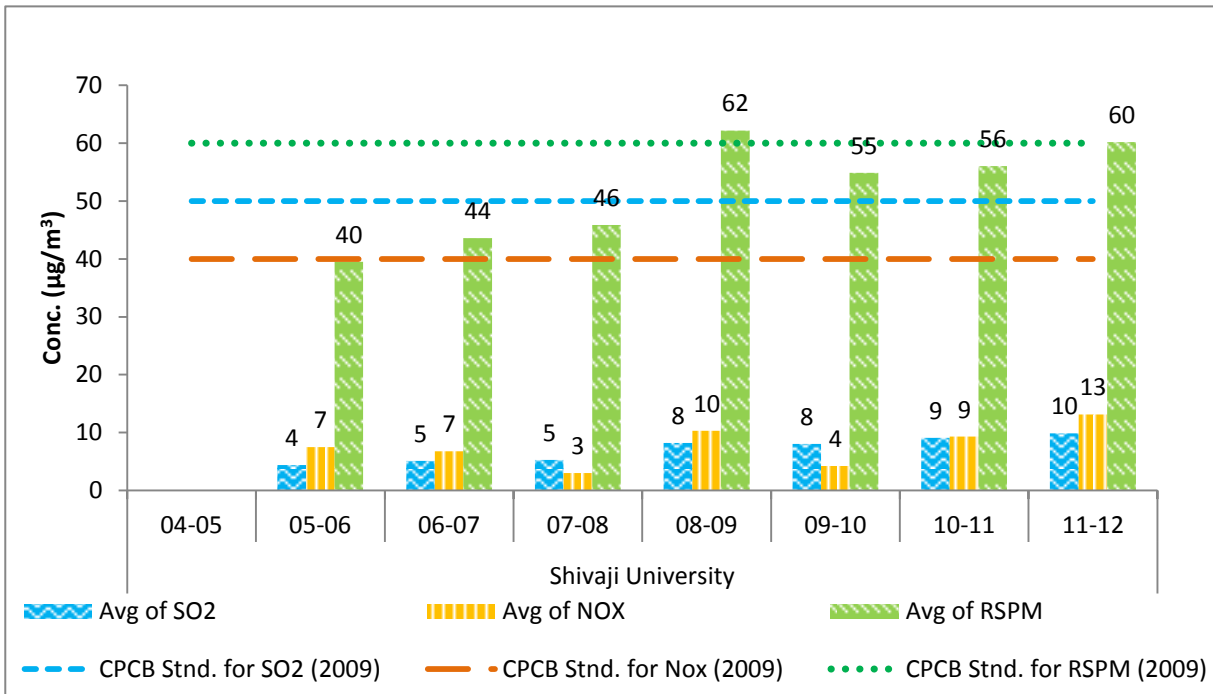


Figure No 88: Annual average trend of SO₂, NO_x and RSPM at Shivaji University Campus – Kolhapur

Sangli – Krishna Valley School

Table No 86: Data for monthly average reading recorded at Krishna Valley School – Sangli

FY	N	Monthly average ($\mu\text{g}/\text{m}^3$)		
		SO ₂	NO _x	RSPM
2011-12				
Apr	9	11	36	100
May	8	11	25	61
Jun	9	9	24	58
Jul	9	9	26	48
Aug	9	9	24	41
Sep	8	7	25	65
Oct	9	8	27	83
Nov	9	11	35	114
Dec	9	9	51	104
Jan	8	12	56	115
Feb	9	15	53	118
Mar	9	14	55	164
Total N		% of exceedence		
105		0.0	0.0	38.1

Table No 87: Data for annual average trend of SO₂, NO_x and RSPM at Krishna Valley School – Sangli

Year	N	Annual average ($\mu\text{g}/\text{m}^3$)		
		SO ₂	NO _x	RSPM
<i>Annual Standards</i>		50	40	60
04-05	-	-	-	-
05-06	-	-	-	-
06-07	-	-	-	-
07-08	-	-	-	-
08-09	70	26	21	71
09-10	102	24	34	82
10-11	104	12	30	75
11-12	105	10	36	89

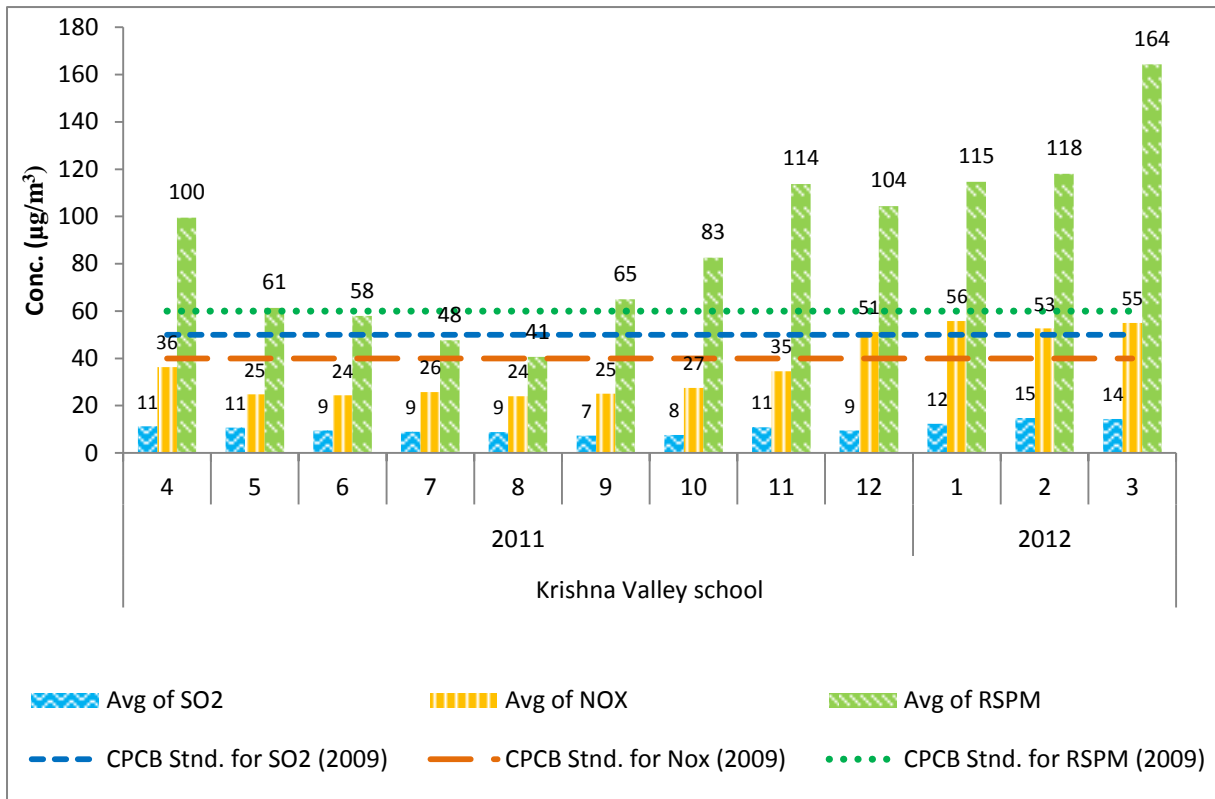


Figure No 89: Monthly average reading recorded at Krishna Valley School – Sangli

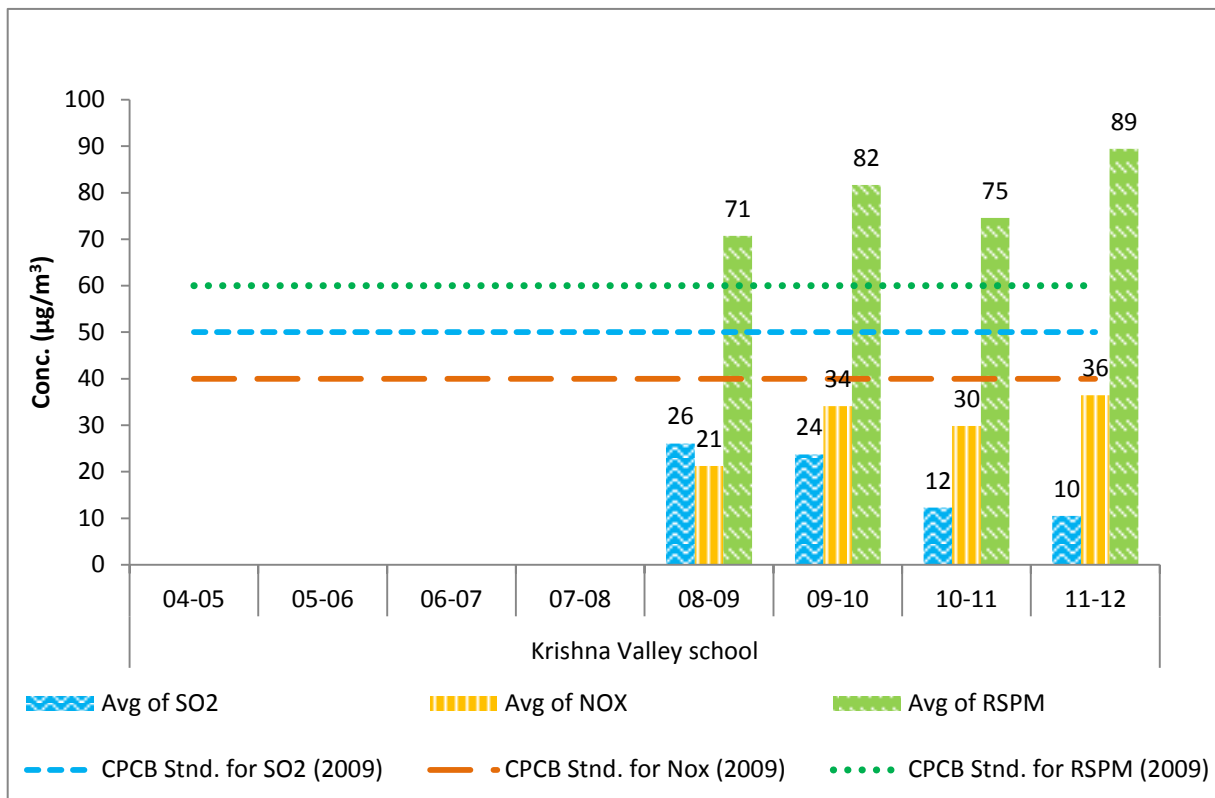


Figure No 90: Annual average trend of SO₂, NO_x and RSPM at Krishna Valley School – Sangli

Sangli – Sangli Miraj Municipal School

Table No 88: Data for monthly average reading recorded at Sangli Miraj Municipal School – Sangli

FY	N	Monthly average ($\mu\text{g}/\text{m}^3$)		
		SO ₂	NO _x	RSPM
2011-12				
Apr	8	11	40	83
May	9	9	21	45
Jun	9	10	23	37
Jul	9	9	25	42
Aug	8	7	22	35
Sep	9	7	25	44
Oct	9	8	30	50
Nov	8	11	49	111
Dec	9	12	64	107
Jan	9	12	31	85
Feb	8	11	60	107
Mar	9	10	44	118
	Total N		% of exceedence	
	104	0.0	0.0	26.0

Table No 89: Data for annual average trend of SO₂, NO_x and RSPM at Sangli Miraj Municipal School – Sangli

Year	N	Annual average ($\mu\text{g}/\text{m}^3$)		
		SO ₂	NO _x	RSPM
<i>Annual Standards</i>		50	40	60
04-05	-	-	-	-
05-06	-	-	-	-
06-07	-	-	-	-
07-08	-	-	-	-
08-09	14	22	23	87
09-10	101	23	32	68
10-11	105	13	32	69
11-12	104	10	36	72

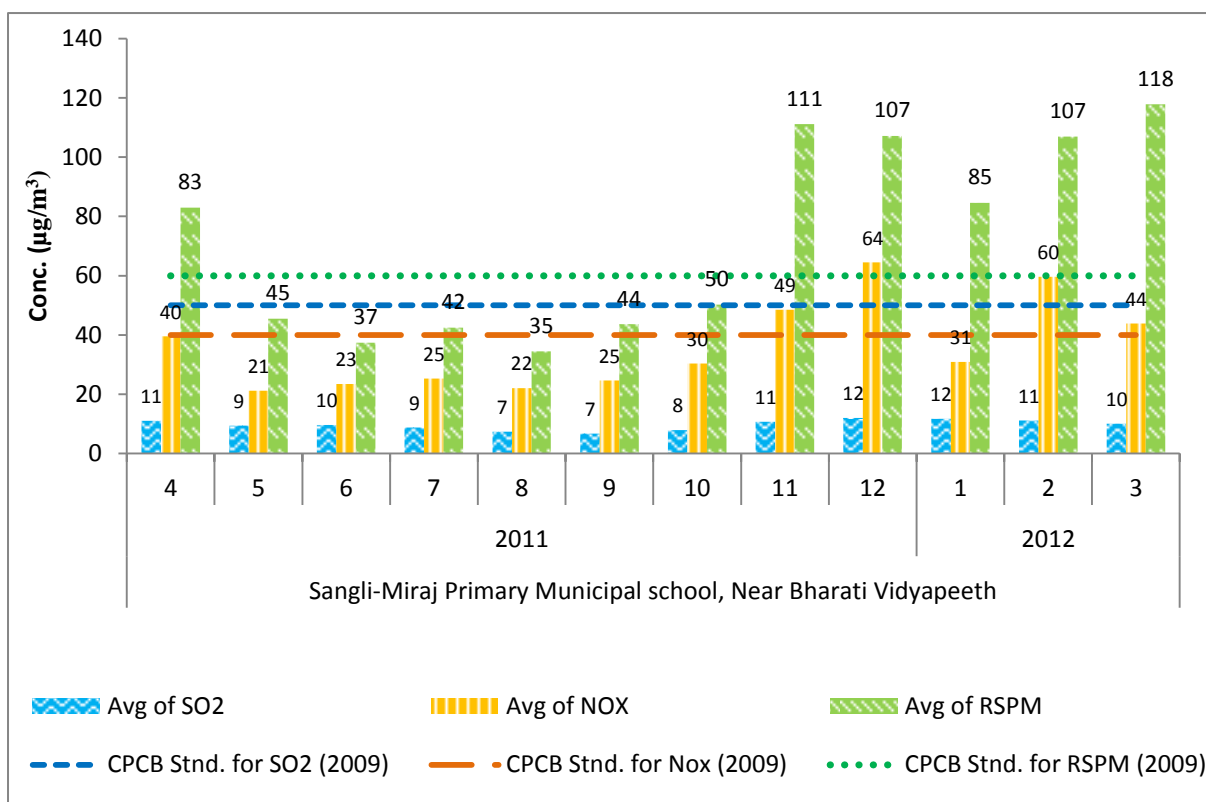


Figure No 91: Monthly average reading recorded at Sangli Miraj Municipal School – Sangli

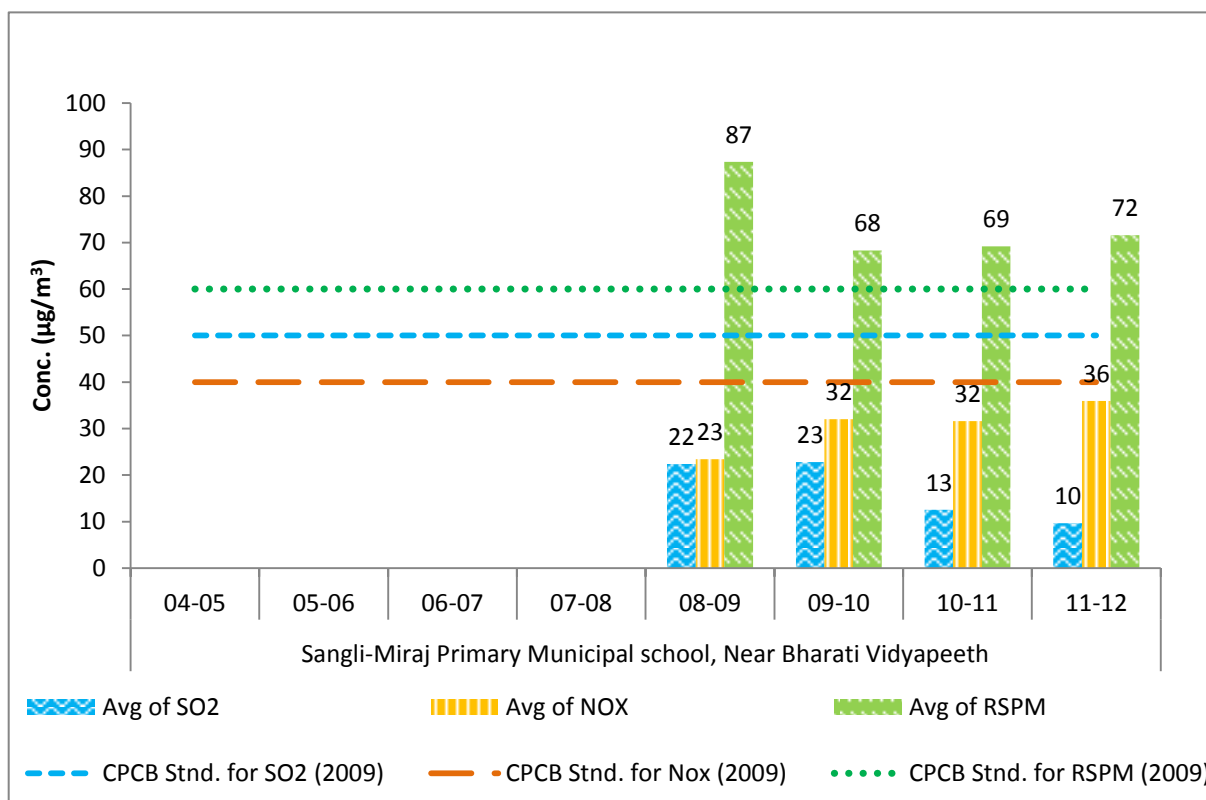


Figure No 92: Annual average trend of SO₂, NO_x and RSPM at Sangli Miraj Municipal School – Sangli

Sangli – SRO Sangali Udyog Bhavan

Table No 90: Data for monthly average reading recorded at Terrace of SRO-Sangli, Udyog Bhavan – Sangli

FY	N	Monthly average ($\mu\text{g}/\text{m}^3$)		
		SO ₂	NO _x	RSPM
2011-12				
Apr	9	10	38	70
May	9	10	20	55
Jun	8	9	22	32
Jul	9	10	25	47
Aug	9	8	22	27
Sep	9	8	24	28
Oct	9	9	29	50
Nov	8	11	42	76
Dec	9	10	54	82
Jan	9	15	61	91
Feb	8	12	54	98
Mar	9	9	40	107
	Total N		% of exceedence	
	105	0.0	0.0	16.2

Table No 91: Data for annual average trend of SO₂, NO_x and RSPM at Terrace of SRO-Sangli, Udyog Bhavan – Sangli

Year	N	Annual average ($\mu\text{g}/\text{m}^3$)		
		SO ₂	NO _x	RSPM
<i>Annual Standards</i>		50	40	60
04-05	-	-	-	-
05-06	-	-	-	-
06-07	-	-	-	-
07-08	-	-	-	-
08-09	69	25	19	57
09-10	102	22	27	54
10-11	104	12	29	54
11-12	105	10	36	63

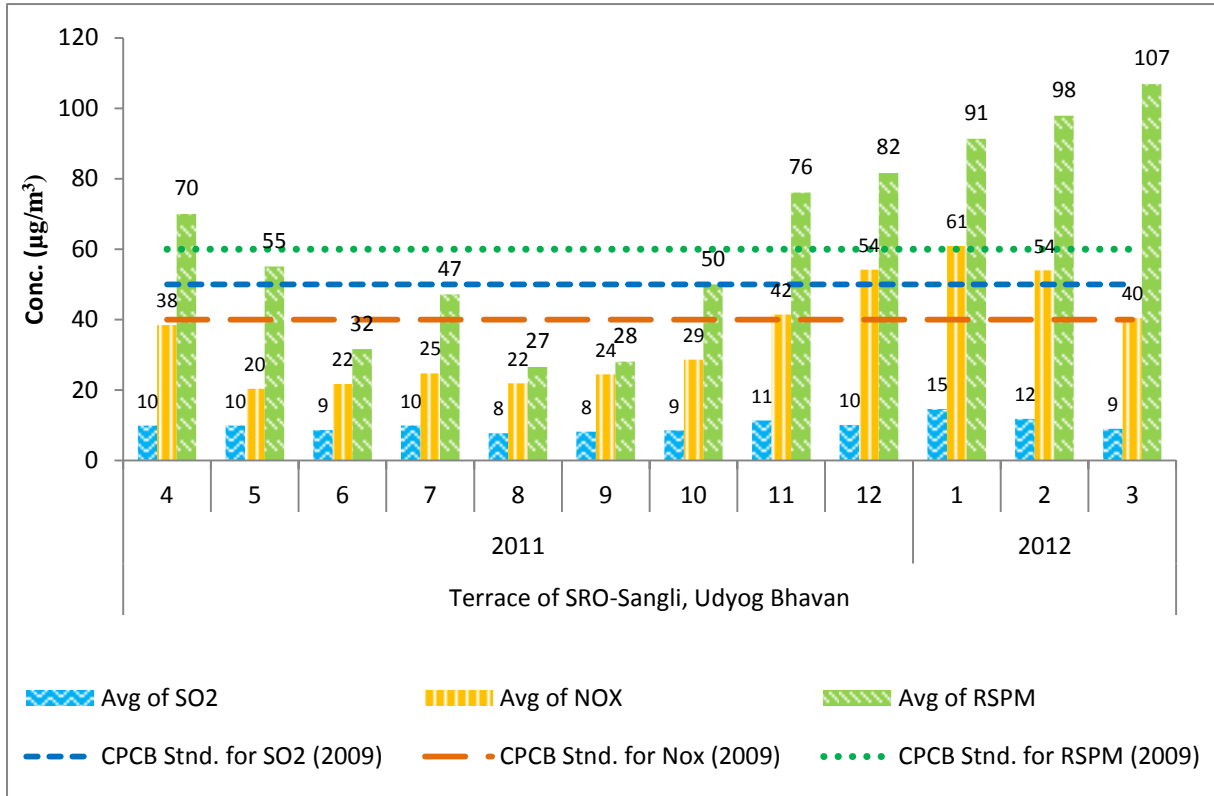


Figure No 93: Monthly average reading recorded at Terrace of SRO-Sangli, Udyog Bhavan – Sangli

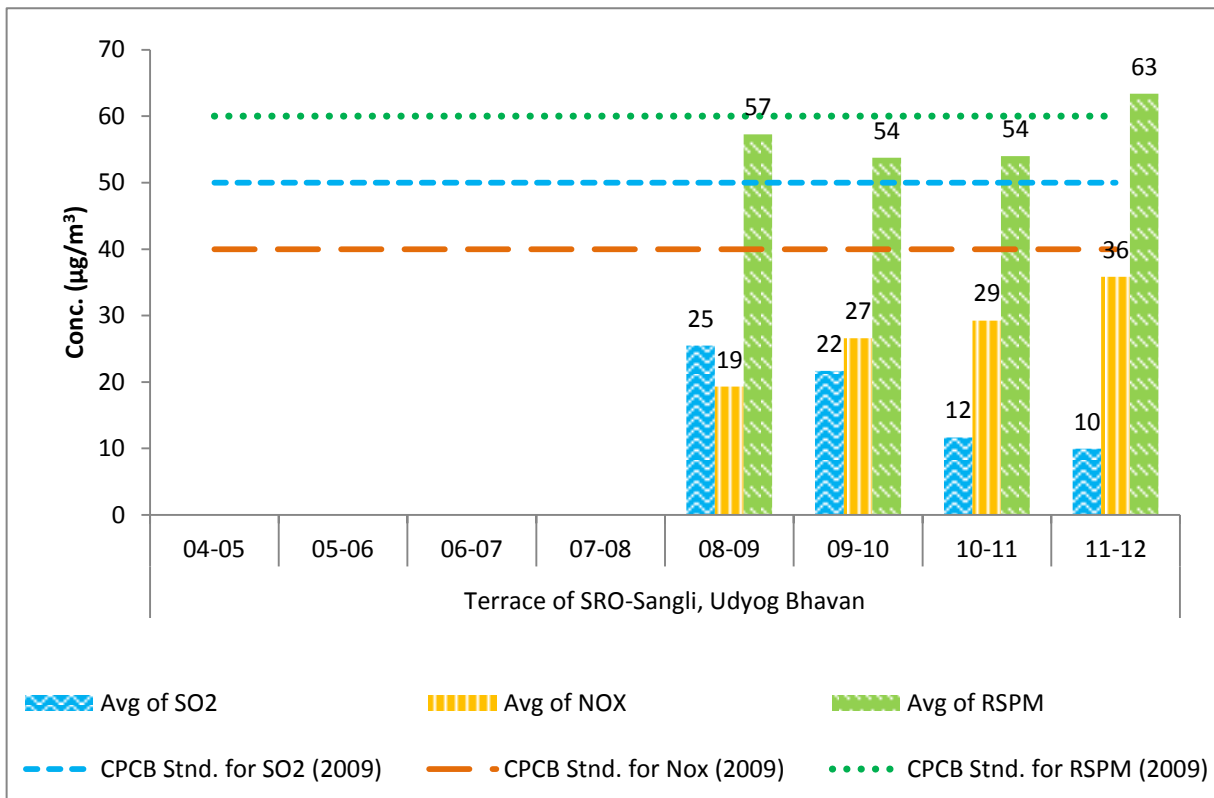
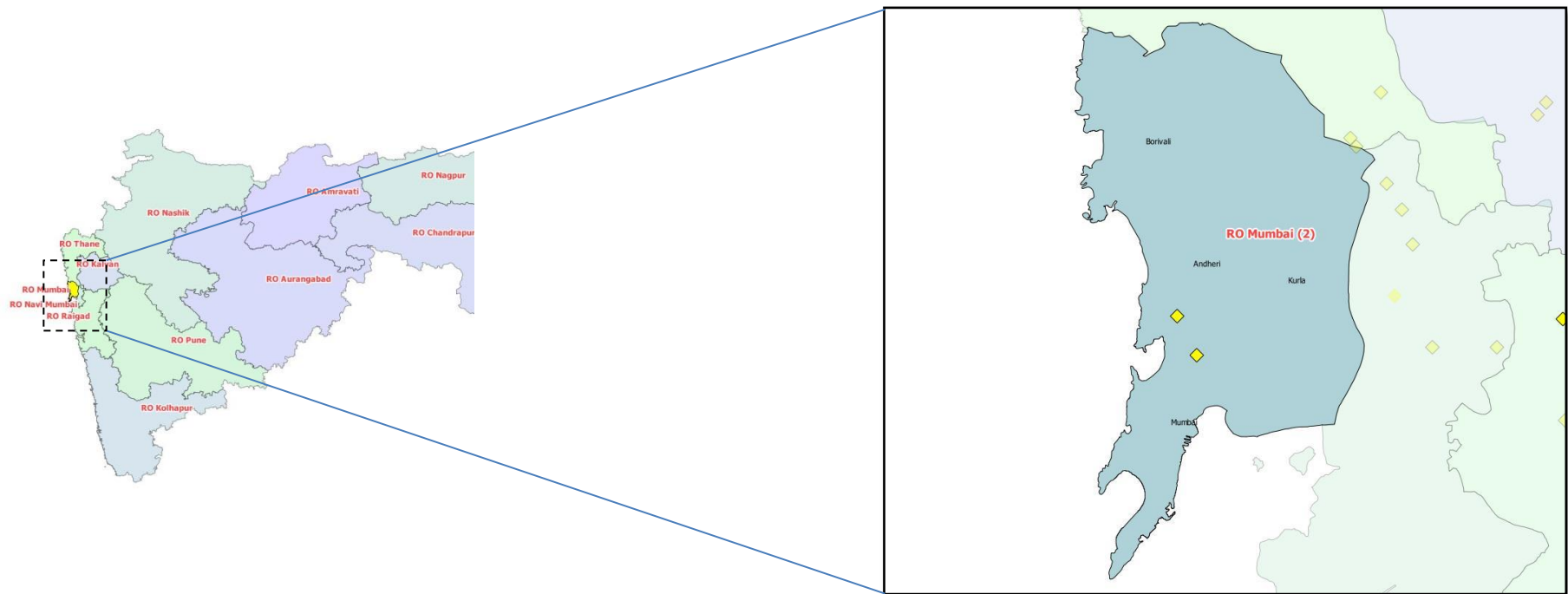


Figure No 94: Annual average trend of SO₂, NO_x and RSPM at Terrace of SRO-Sangli, Udyog Bhavan – Sangli

RO – Mumbai



Region	Program name	SN	Station	Frequency	Latitude	Longitude
Mumbai	CAAQMS	1	Bandra	Continuous Monitoring	19° 03.785'	72° 50.787'
		2	Sion	Continuous Monitoring	19° 02.132'	72° 51.588'

Mumbai - Bandra

Table No 92: Data for monthly average reading recorded at Bandra – Mumbai

FY	N	Monthly average ($\mu\text{g}/\text{m}^3$)		
		SO ₂	NO _x	RSPM
2011-12				
Apr	29	18	37	125
May	29	21	31	87
Jun	30	22	85	79
Jul	31	21	101	66
Aug	31	16	71	61
Sep	26	15	59	69
Oct	31	20	71	125
Nov	28	19	93	160
Dec	30	24	58	197
Jan	29	25	60	173
Feb	28	25	59	195
Mar	31	20	55	233
Total N		% of exceedence		
353		0.0	19.3	55.8

Table No 93: Data for annual average trend of SO₂, NO_x and RSPM at Bandra – Mumbai

Year	N	Annual average ($\mu\text{g}/\text{m}^3$)		
		SO ₂	NO _x	RSPM
<i>Annual Standards</i>		50	40	60
04-05	-	-	-	-
05-06	-	-	-	-
06-07	-	-	-	-
07-08	233	19	59	158
08-09	335	19	60	137
09-10	339	17	90	140
10-11	349	19	48	116
11-12	353	21	65	131

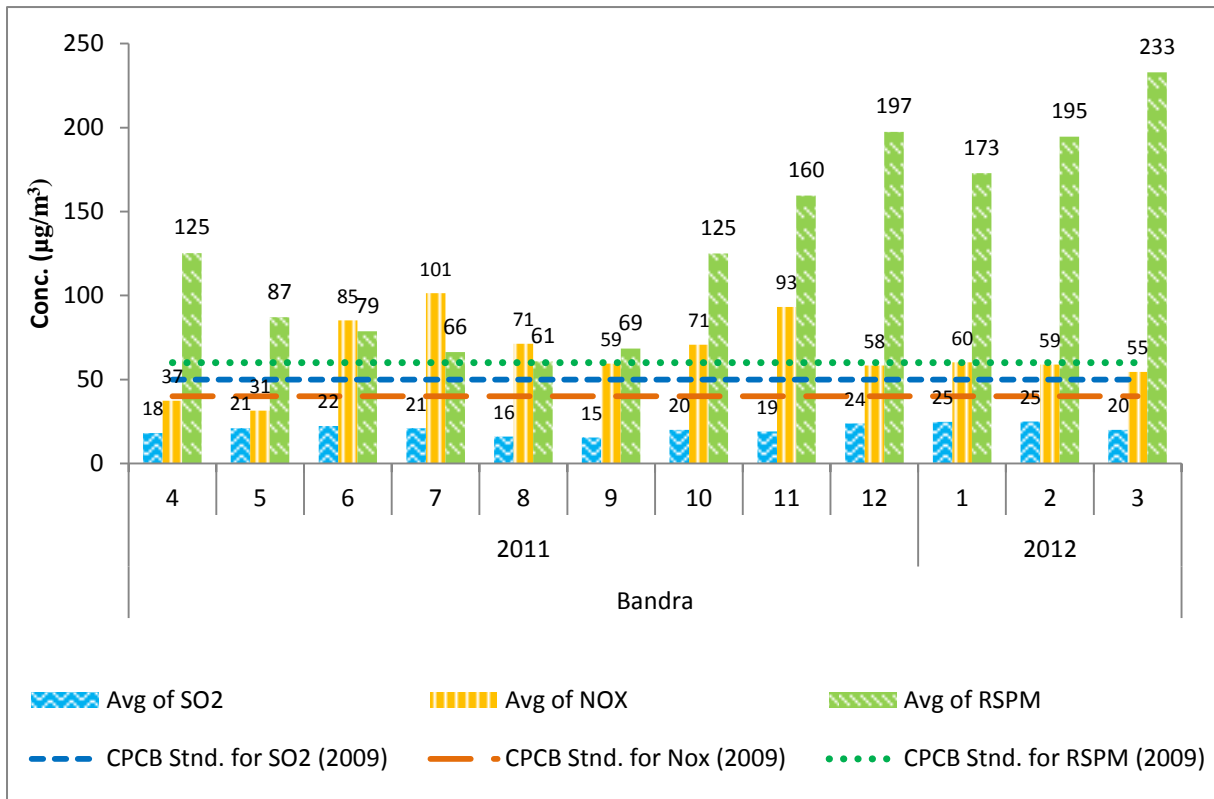


Figure No 95: Monthly average reading recorded at Bandra – Mumbai

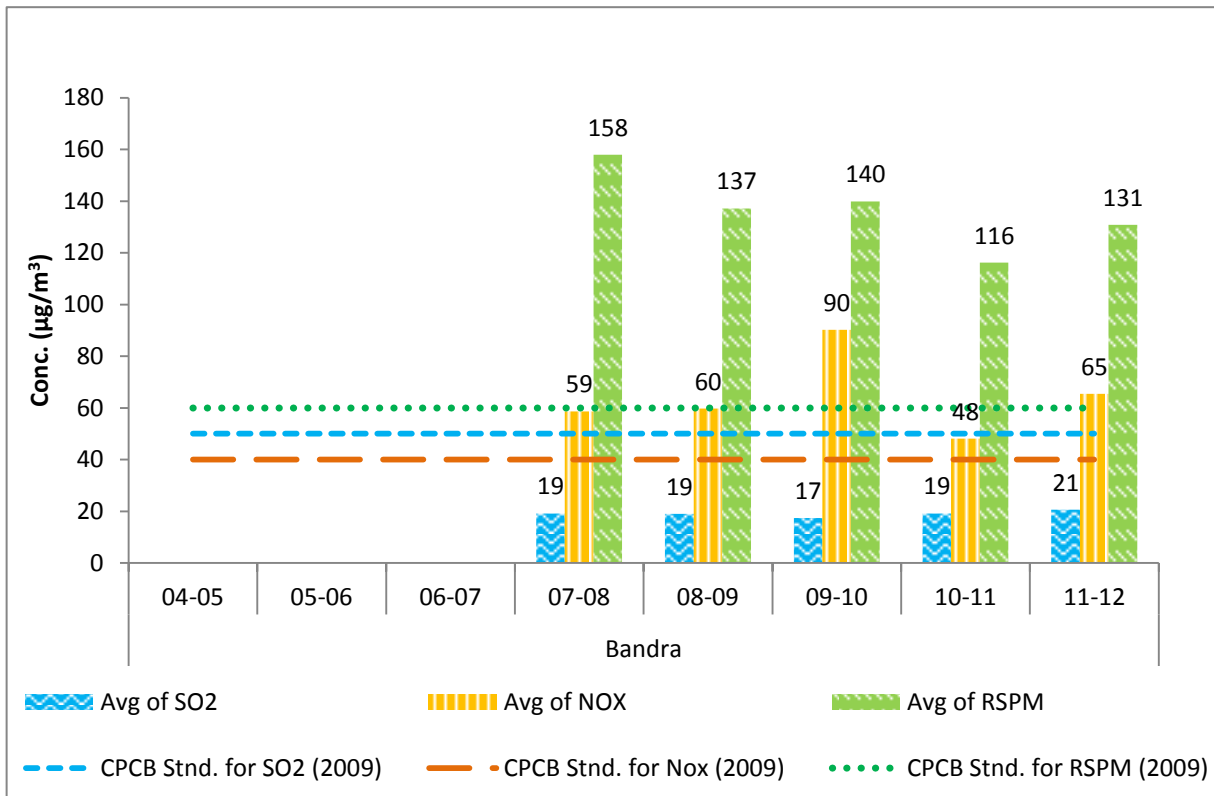


Figure No 96: Annual average trend of SO₂, NO_x and RSPM at Bandra – Mumbai

Mumbai - Sion

Table No 94: Data for monthly average reading recorded at Sion- Mumbai

FY	N	Monthly average ($\mu\text{g}/\text{m}^3$)		
		SO ₂	NO _x	RSPM
2011-12				
Apr	17	9	205	181
May	20	5	41	169
Jun	-	-	-	-
Jul	-	-	-	-
Aug	19	5	32	105
Sep	21	10	46	120
Oct	17	18	72	176
Nov	22	10	57	141
Dec	23	8	43	110
Jan	19	8	46	102
Feb	22	19	75	198
Mar	20	13	65	203
Total N			% of exceedence	
200		0.5	20.0	77.0

Table No 95: Data for annual average trend of SO₂, NO_x and RSPM at Sion- Mumbai

Year	N	Annual average ($\mu\text{g}/\text{m}^3$)		
		SO ₂	NO _x	RSPM
<i>Annual Standards</i>		50	40	60
04-05	280	21	67	197
05-06	317	26	105	231
06-07	278	30	91	255
07-08	288	28	139	295
08-09	84	24	97	202
09-10	236	18	109	223
10-11	259	14	116	181
11-12	200	10	66	150

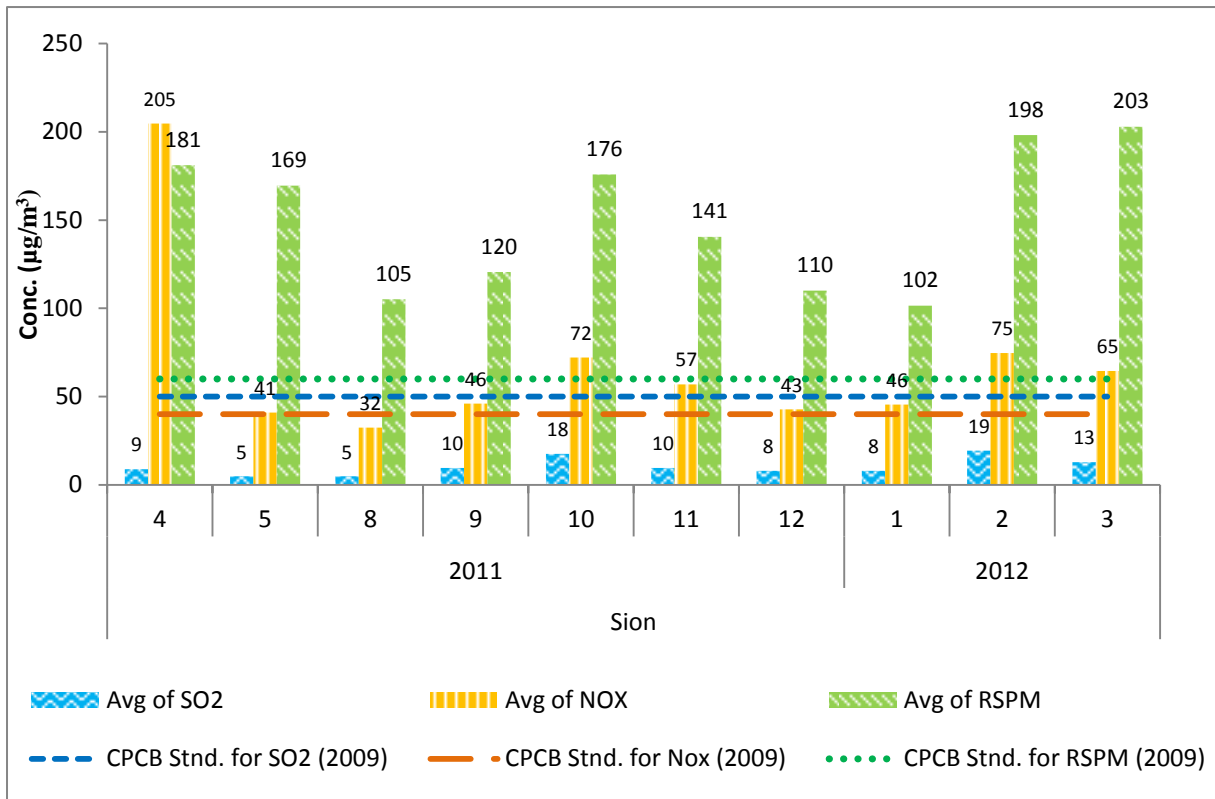


Figure No 97: Monthly average reading recorded at Sion- Mumbai

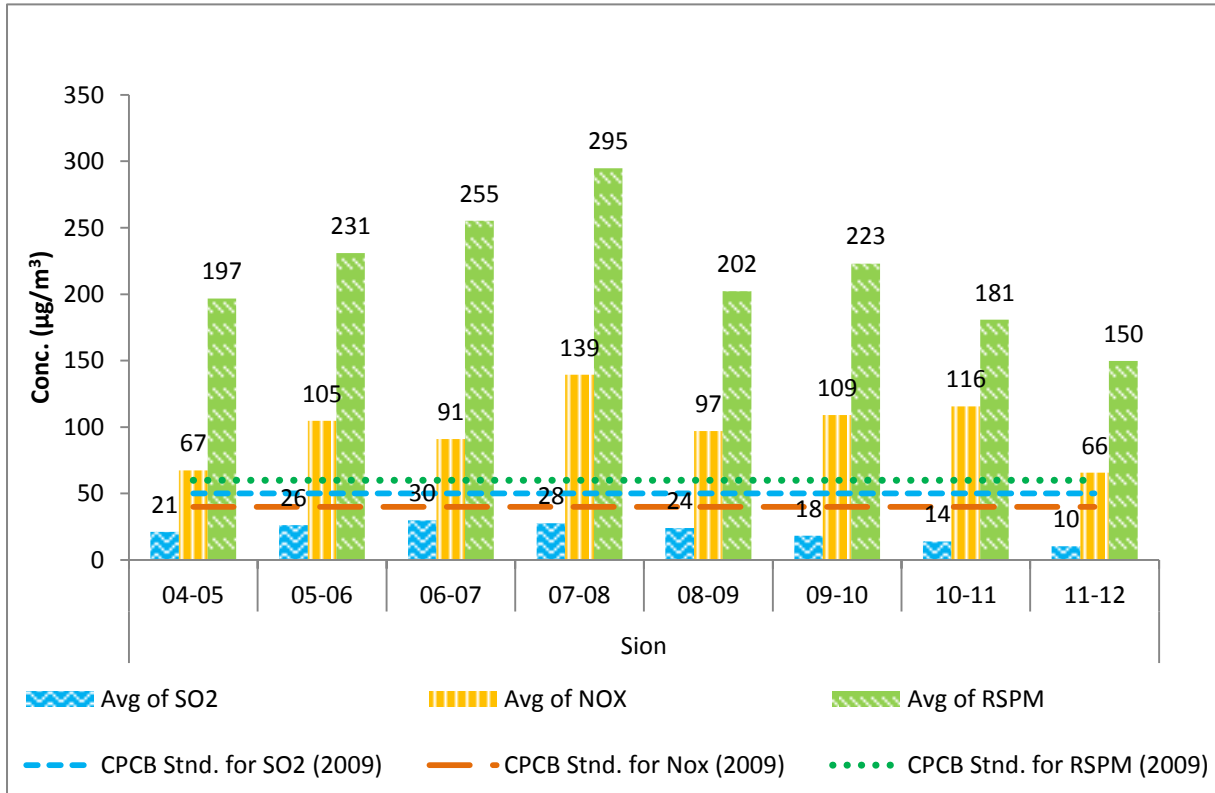


Figure No 98: Annual average trend of SO₂, NO_x and RSPM at Sion- Mumbai

Mumbai - Neeri Office, Worli

Table No 96: Data for monthly average reading recorded at Neeri Office, Worli - Mumbai

FY	N	Monthly average ($\mu\text{g}/\text{m}^3$)		
		SO ₂	NO _x	RSPM
2011-12				
Apr	-	-	-	-
May	-	-	-	-
Jun	-	-	-	-
Jul	-	-	-	-
Aug	-	-	-	-
Sep	-	-	-	-
Oct	-	-	-	-
Nov	-	-	-	-
Dec	-	-	-	-
Jan	-	-	-	-
Feb	8	14	34	84
Mar	-	-	-	-
	Total N		% of exceedence	
	8	0.0	0.0	37.5

Table No 97: Data for annual average trend of SO₂, NO_x and RSPM at Neeri Office, Worli – Mumbai

Year	N	Annual average ($\mu\text{g}/\text{m}^3$)		
		SO ₂	NO _x	RSPM
		50	40	60
<i>Annual Standards</i>				
04-05	-	-	-	-
05-06	-	-	-	-
06-07	-	-	-	-
07-08	3	14	55	145
08-09	5	3	16	111
09-10	1	10	53	21
10-11	-	-	-	-
11-12	8	14	34	84

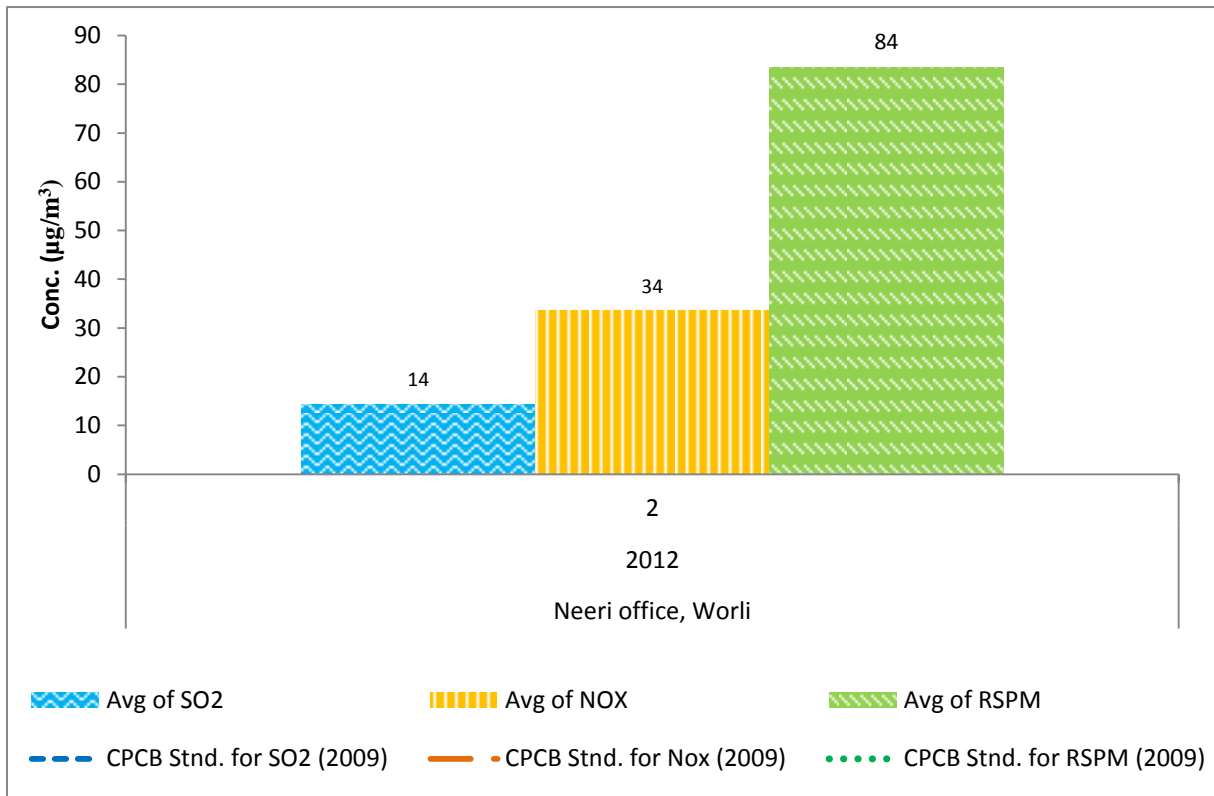


Figure No 99: Monthly average reading recorded at Neeri Office, Worli - Mumbai

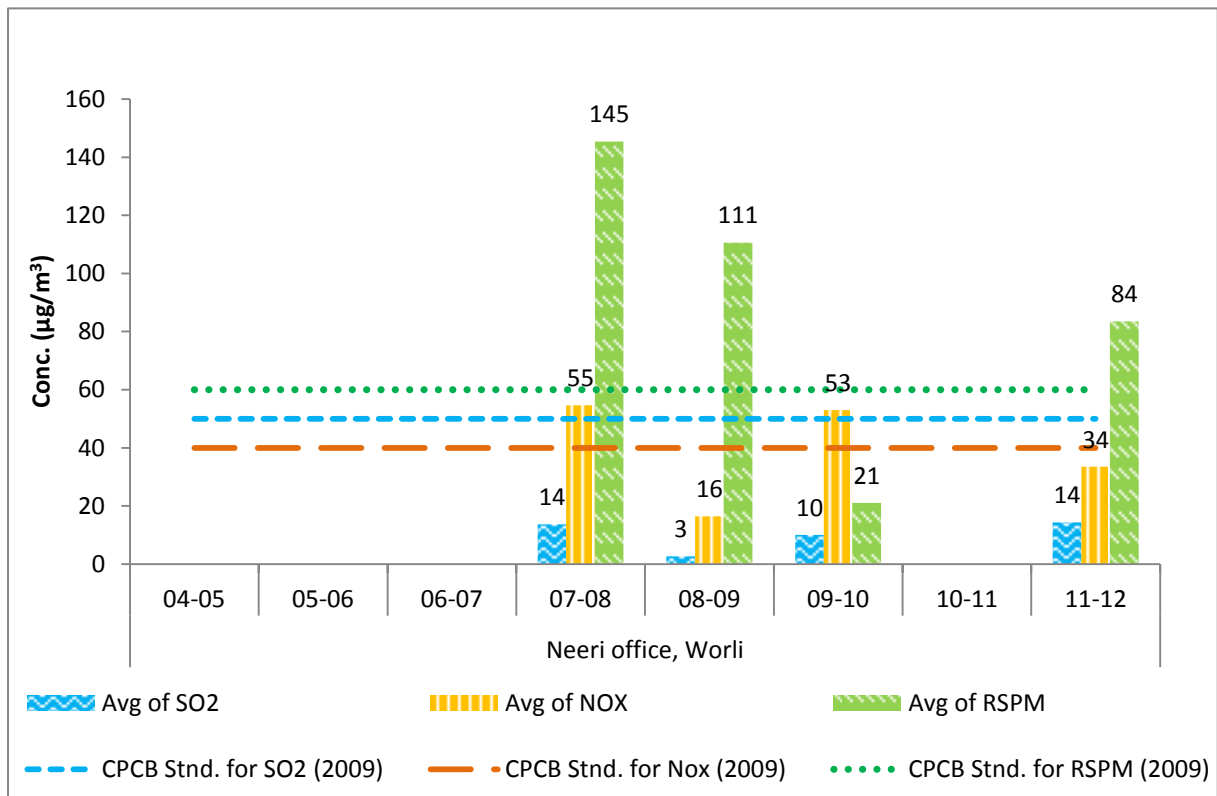
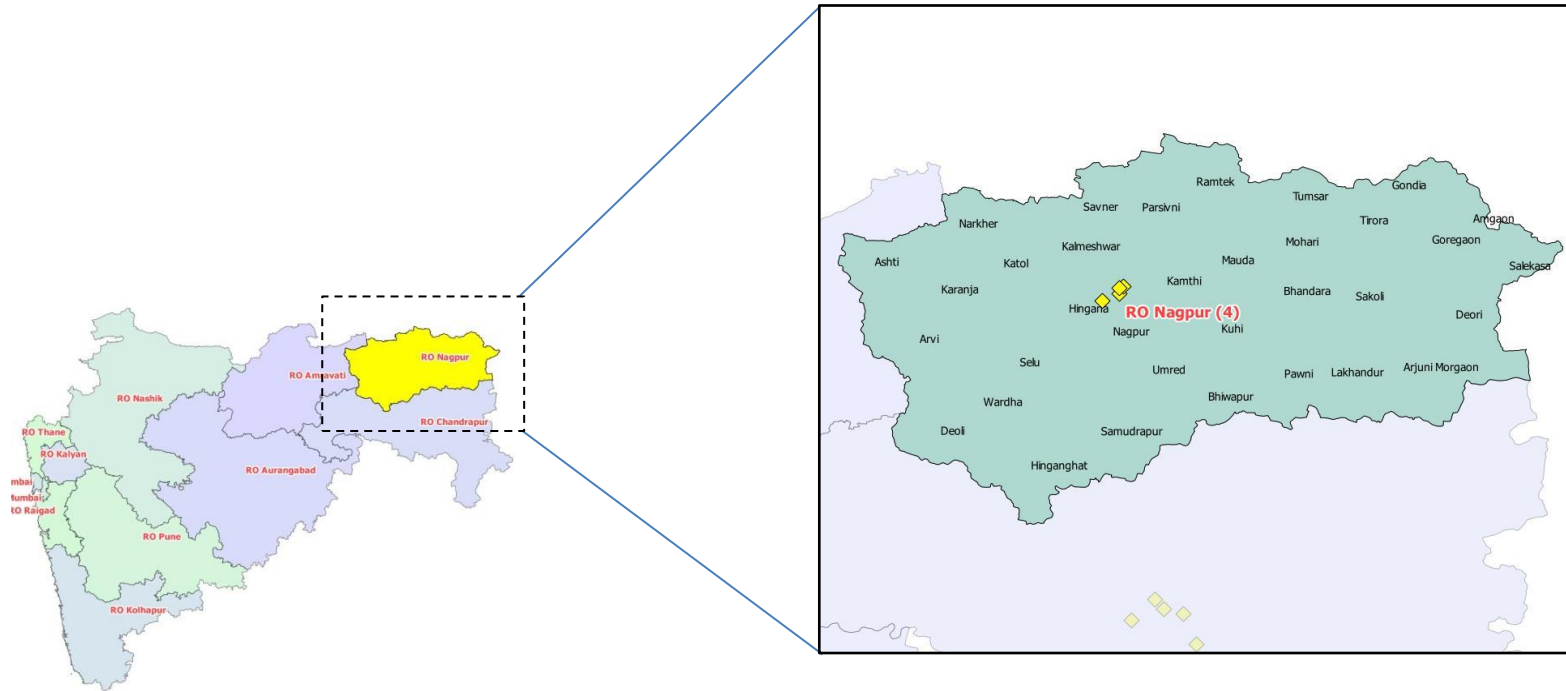


Figure No 100: Annual average trend of SO₂, NO_x and RSPM at Neeri Office, Worli – Mumbai

RO – Nagpur



Region	Program	Station Codes	Station	Frequency	Latitude	Longitude
Nagpur	NAMP	288	MIDC Office, Hingna Road	Two Days In A Week	21° 06.592'	79° 00.454'
		287	IOE North Ambazari road	Two Days In A Week	21° 08.166'	79° 04.141'
		314	Govt Polytechnic Col, Sadar	Two Days In A Week	21° 9.794'	79° 4.959'
		711	Civil lines Nagpur	Six days in a week	21° 09.477'	79° 04.202'

Nagpur – MIDC Office, Hingna Road

Table No 98: Data for monthly average reading recorded at MIDC Office, Hingna Road - Nagpur

FY	N	Monthly average ($\mu\text{g}/\text{m}^3$)		
		SO ₂	NO _x	RSPM
2011-12				
Apr	8	10	33	81
May	8	10	35	63
Jun	8	12	40	95
Jul	7	10	31	108
Aug	7	8	26	97
Sep	8	9	27	121
Oct	8	10	35	89
Nov	9	11	43	137
Dec	10	10	33	107
Jan	9	10	37	78
Feb	8	12	42	156
Mar	9	11	40	122
	Total N		% of exceedence	
	99	0.0	1.0	44.4

Table No 99: Data for annual average trend of SO₂, NO_x and RSPM at MIDC Office, Hingna Road - Nagpur

Year	N	Annual average ($\mu\text{g}/\text{m}^3$)		
		SO ₂	NO _x	RSPM
<i>Annual Standards</i>		50	40	60
04-05	75	9	22	51
05-06	81	10	34	40
06-07	78	9	25	90
07-08	92	9	24	160
08-09	96	9	30	118
09-10	104	10	38	128
10-11	95	10	34	113
11-12	99	10	35	105

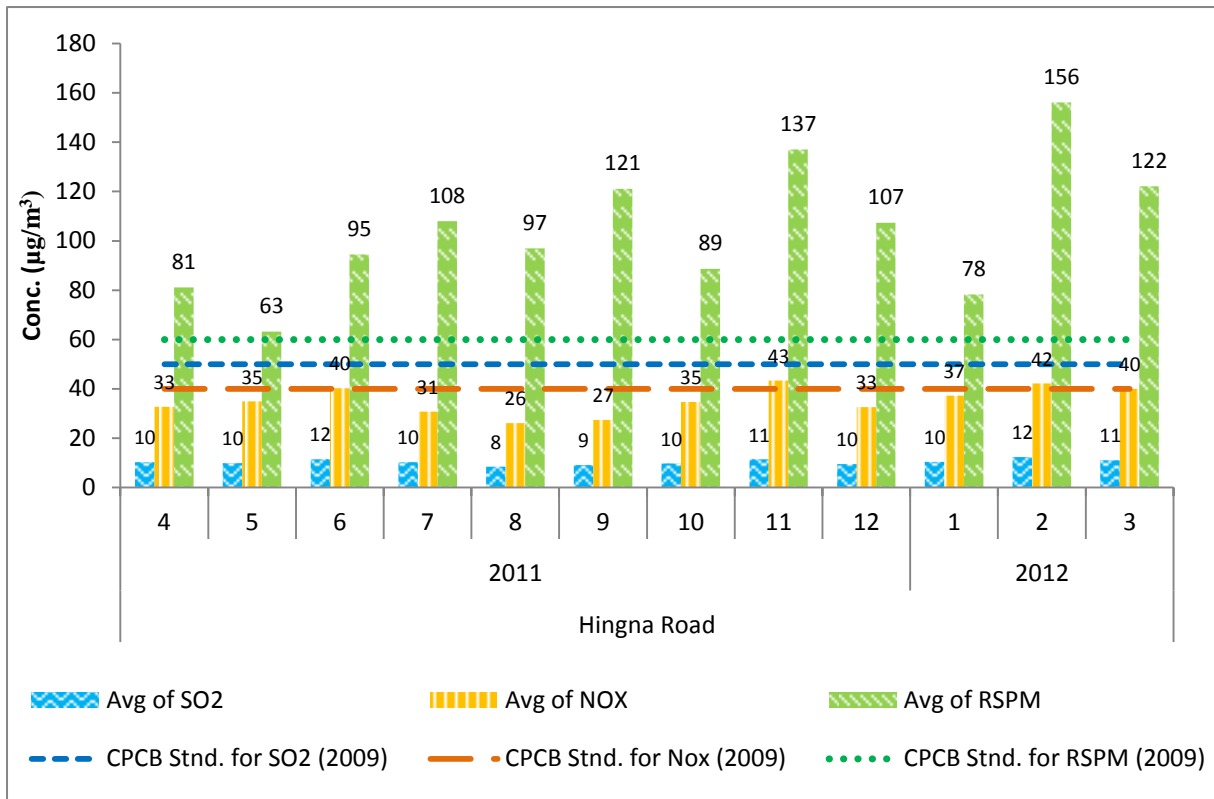


Figure No 101: Monthly average reading recorded at MIDC Office, Hingna Road - Nagpur

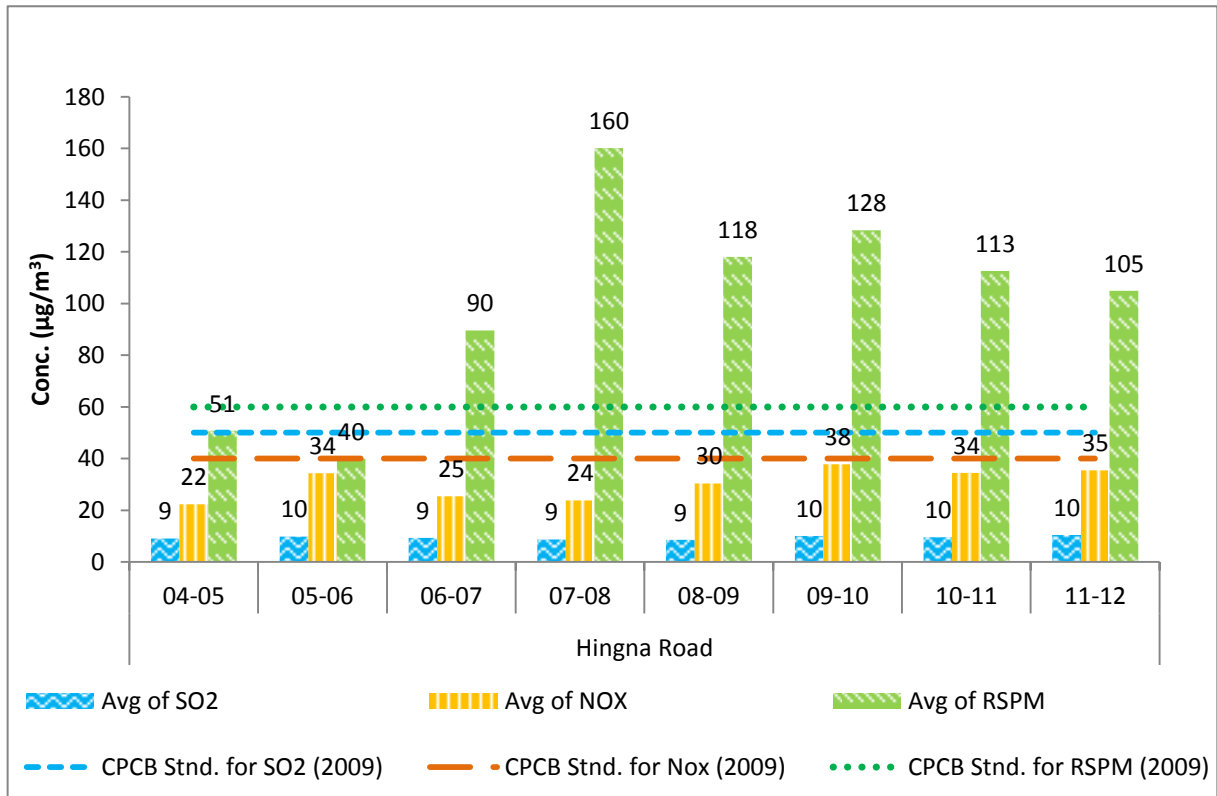


Figure No 102: Annual average trend of SO₂, NO_x and RSPM at MIDC Office, Hingna Road - Nagpur

Nagpur – IOE North Ambazari Road

Table No 100: Data for monthly average reading recorded at IOE North Ambazari road - Nagpur

FY	N	Monthly average ($\mu\text{g}/\text{m}^3$)		
		SO ₂	NO _x	RSPM
2011-12				
Apr	8	9	29	64
May	9	8	25	73
Jun	7	8	30	60
Jul	7	9	25	69
Aug	8	8	26	83
Sep	8	8	25	72
Oct	9	13	56	126
Nov	8	11	45	102
Dec	9	10	32	88
Jan	8	12	41	77
Feb	9	11	38	91
Mar	9	10	33	89
	Total N		% of exceedence	
	99	0.0	3.0	25.3

Table No 101: Data for annual average trend of SO₂, NO_x and RSPM at IOE North Ambazari road – Nagpur

Year	N	Annual average ($\mu\text{g}/\text{m}^3$)		
		SO ₂	NO _x	RSPM
<i>Annual Standards</i>		50	40	60
04-05	77	8	21	52
05-06	66	9	30	44
06-07	85	10	27	66
07-08	95	8	22	125
08-09	99	8	30	114
09-10	107	10	36	109
10-11	101	10	33	96
11-12	99	10	34	84

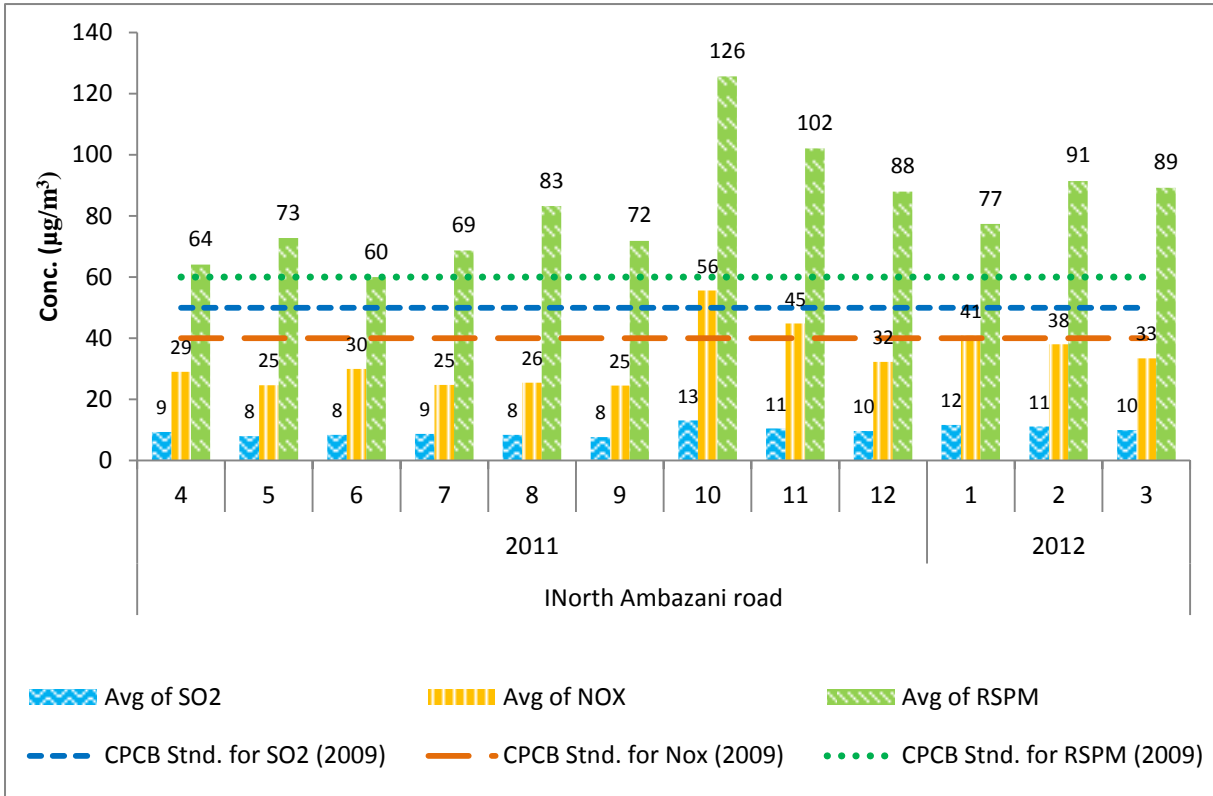


Figure No 103: Monthly average reading recorded at IOE North Ambazari road - Nagpur

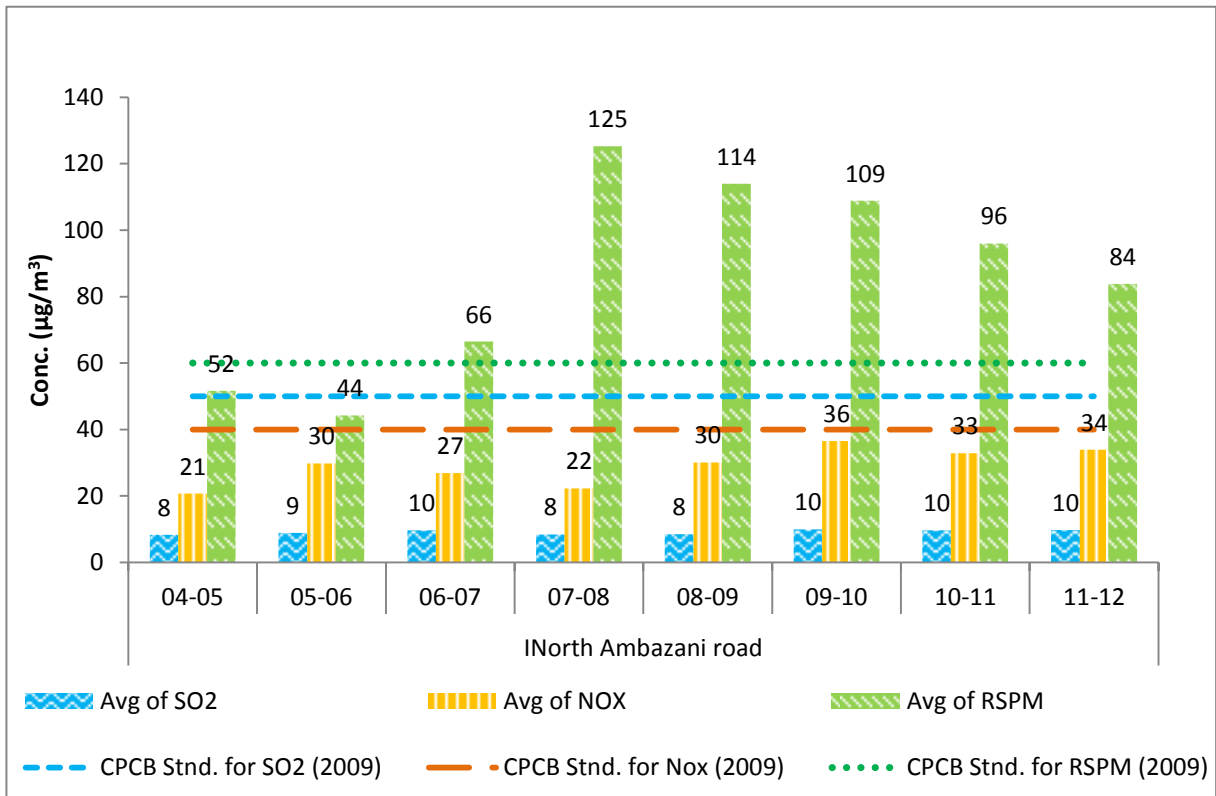


Figure No 104: Annual average trend of SO₂, NO_x and RSPM at IOE North Ambazari road – Nagpur

Nagpur - Govt Polytechnic Col, Sadar

Table No 102: Data for monthly average reading recorded at Govt Polytechnic Col, Sadar – Nagpur

FY	N	Monthly average ($\mu\text{g}/\text{m}^3$)		
		SO ₂	NO _x	RSPM
2011-12				
Apr	8	9	27	53
May	9	5	13	105
Jun	8	10	32	63
Jul	8	9	26	79
Aug	9	8	23	62
Sep	9	7	23	64
Oct	9	11	37	105
Nov	9	10	38	82
Dec	9	9	31	77
Jan	9	10	34	60
Feb	8	11	35	98
Mar	18	11	37	97
	Total N		% of exceedence	
	113	0.0	0.9	22.1

Table No 103: Data for annual average trend of SO₂, NO_x and RSPM at Govt Polytechnic Col, Sadar - Nagpur

Year	N	Annual average ($\mu\text{g}/\text{m}^3$)		
		SO ₂	NO _x	RSPM
		50	40	60
<i>Annual Standards</i>				
04-05	75	9	21	45
05-06	76	9	32	52
06-07	84	9	26	70
07-08	93	8	21	107
08-09	81	8	27	101
09-10	102	9	31	93
10-11	102	9	30	87
11-12	113	9	30	80

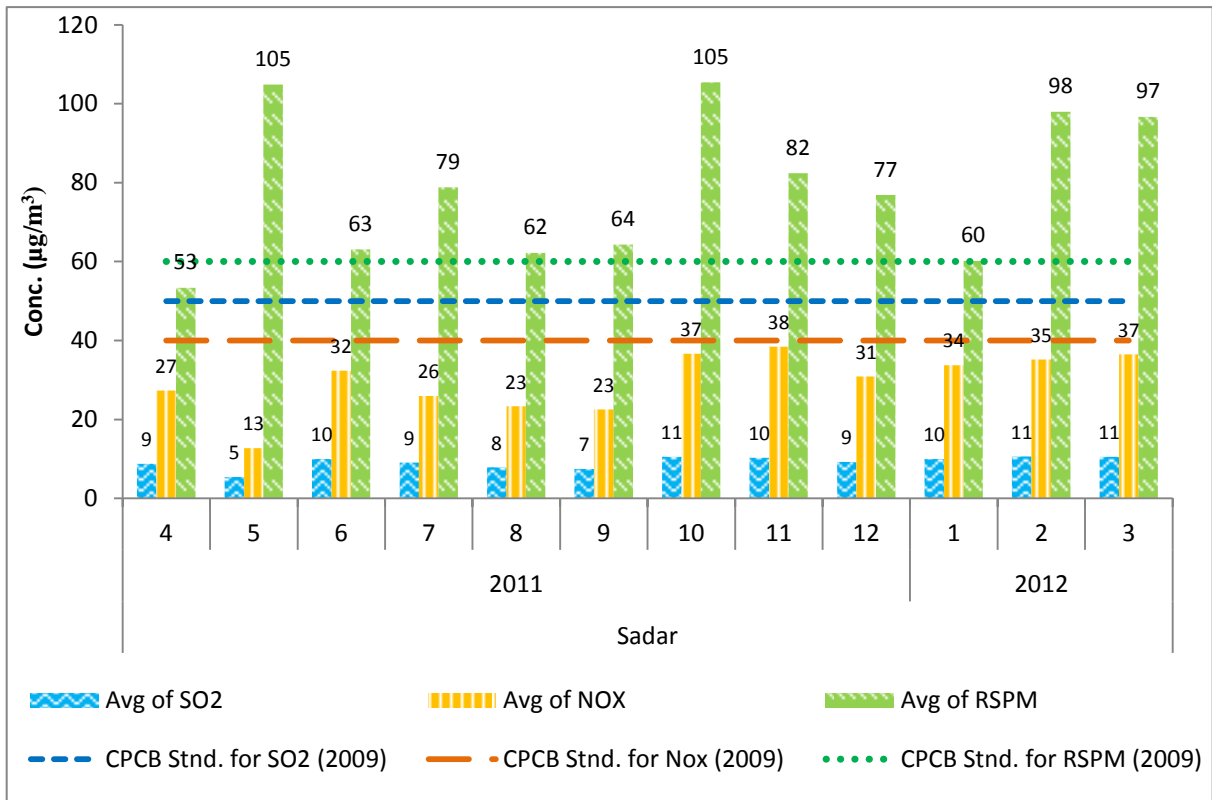


Figure No 105: Monthly average reading recorded at Govt Polytechnic Col, Sadar – Nagpur

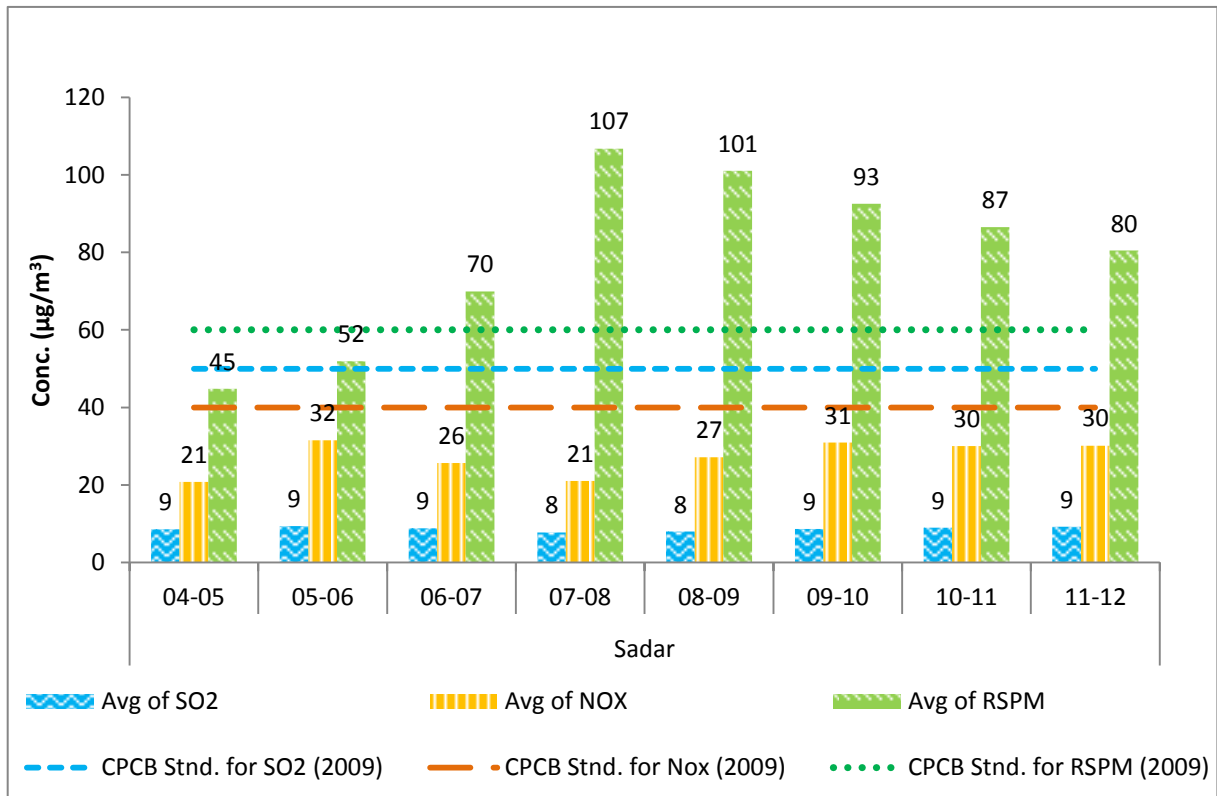


Figure No 106: Annual average trend of SO₂, NO_x and RSPM at Govt Polytechnic Col, Sadar - Nagpur

Nagpur – Civil Lines

Table No 104: Data for monthly average reading recorded at Civil Lines Nagpur

FY	N	Monthly average ($\mu\text{g}/\text{m}^3$)		
		SO ₂	NO _x	RSPM
2011-12				
Apr	22	8	24	51
May	22	8	26	61
Jun	-	-	-	-
Jul	23	8	21	38
Aug	10	9	27	55
Sep	21	8	24	42
Oct	24	9	27	54
Nov	24	9	29	56
Dec	24	9	29	64
Jan	24	9	29	65
Feb	23	9	28	58
Mar	26	9	27	55

Table No 105: Data for annual average trend of SO₂, NO_x and RSPM at Civil Lines Nagpur

Year	N	Annual average ($\mu\text{g}/\text{m}^3$)		
		SO ₂	NO _x	RSPM
<i>Annual Standards</i>		50	40	60
04-05	207	17	25	53
05-06	313	15	22	66
06-07	277	14	28	76
07-08	288	14	30	70
08-09	280	18	31	84
09-10	269	13	35	85
10-11	273	9	28	66
11-12	243	9	26	55

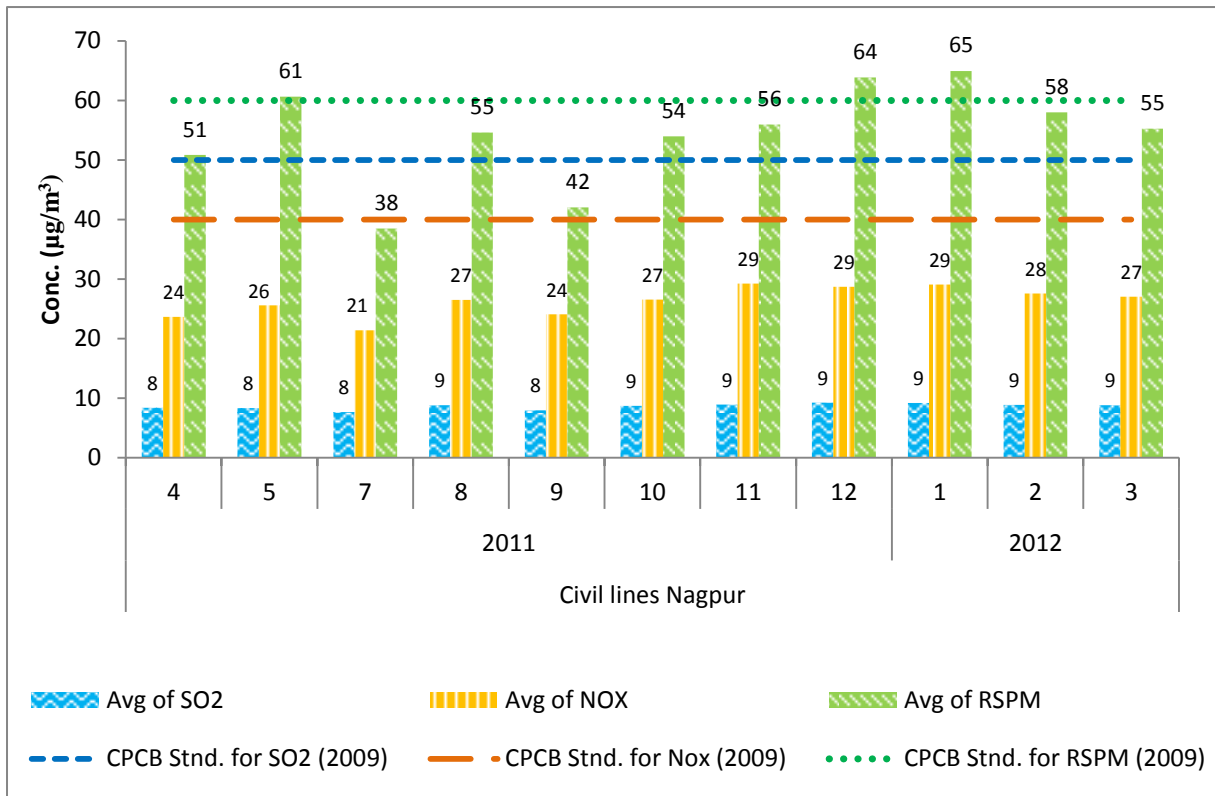


Figure No 107: Monthly average reading recorded at Civil Lines Nagpur

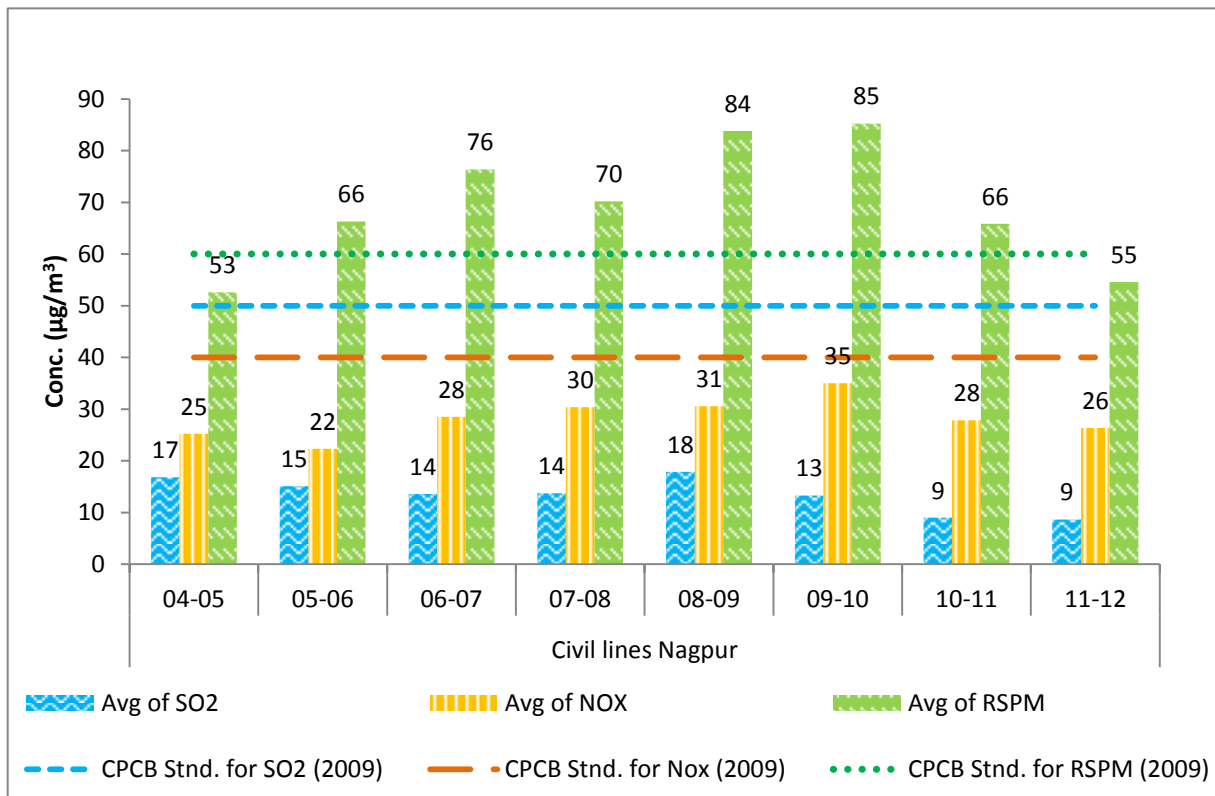
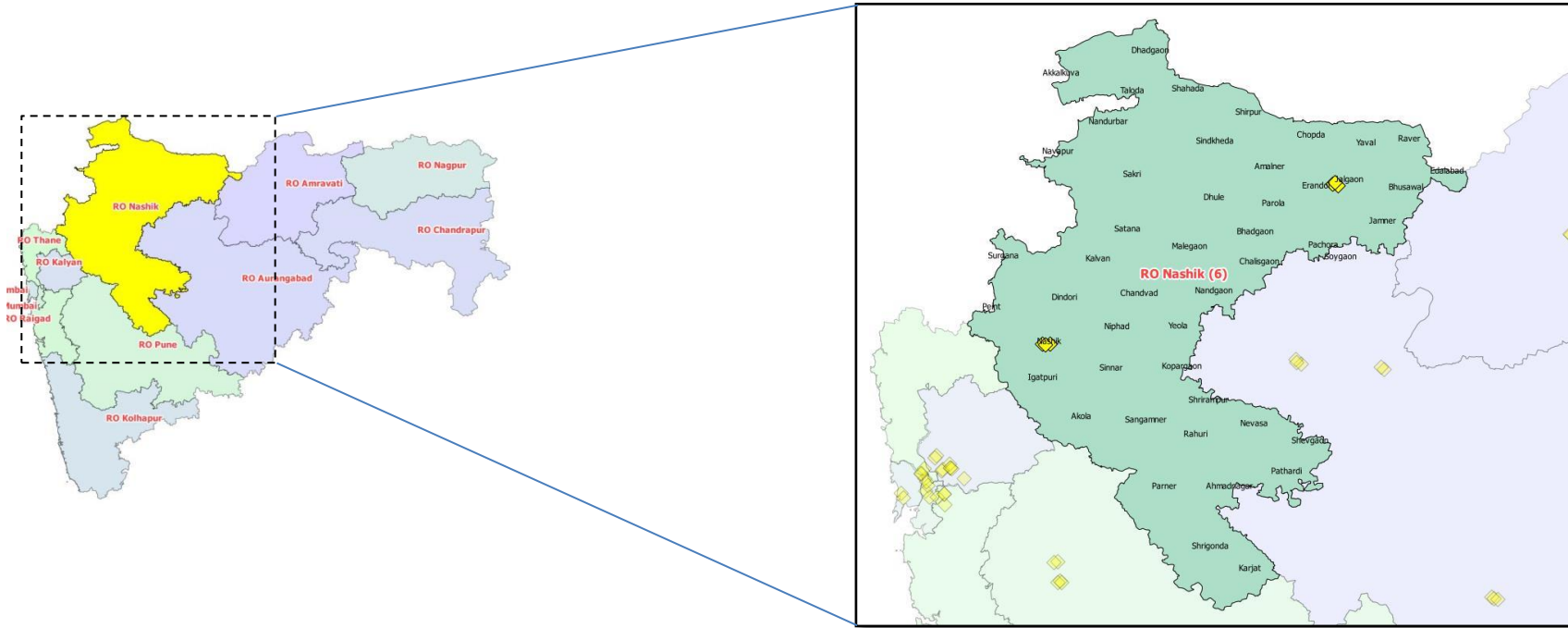


Figure No 108: Annual average trend of SO₂, NO_x and RSPM at Civil Lines Nagpur

RO – Nashik



Region	Program	Station Codes	Station	Frequency	Latitude	Longitude
Jalgaon	NAMP	645	Girna Water Tank	Twice in week	20° 59.821'	75° 33.078'
		646	MIDC Jalgaon	Twice in week	20° 59.336'	75° 35.069'
		644	Old B. J. Market	Twice in week	21° 00.620'	75° 34.024'
Nashik	NAMP	269	MIDC Satpur - VIP	Two Days In A Week	19° 59.904'	73° 43.687'
		259	RTO Colony	Two Days In A Week	19° 59.815'	73° 46.588'
		710	SRO Office Nashik	Six days in a week	19° 59.548'	73° 45.018'

Jalgaon - Girna Water Tank

Table No 106: Data for monthly average reading recorded at Girna Water Tank – Jalgaon

FY	N	Monthly average ($\mu\text{g}/\text{m}^3$)		
		SO ₂	NO _x	RSPM
2011-12				
Apr	9	15	42	126
May	8	14	40	114
Jun	6	11	35	92
Jul	10	10	33	88
Aug	8	9	27	76
Sep	-	-	-	-
Oct	9	11	34	103
Nov	8	12	36	167
Dec	10	16	41	123
Jan	8	16	42	124
Feb	8	17	42	125
Mar	10	15	43	136
	Total N		% of exceedence	
	94	0.0	0.0	78.7

Table No 107: Data for annual average trend of SO₂, NO_x and RSPM at Girna Water Tank – Jalgaon

Year	N	Annual average ($\mu\text{g}/\text{m}^3$)		
		SO ₂	NO _x	RSPM
<i>Annual Standards</i>		50	40	60
04-05	-	-	-	-
05-06	-	-	-	-
06-07	-	-	-	-
07-08	-	-	-	-
08-09	36	11	40	102
09-10	104	13	43	110
10-11	103	16	42	122
11-12	94	13	38	116

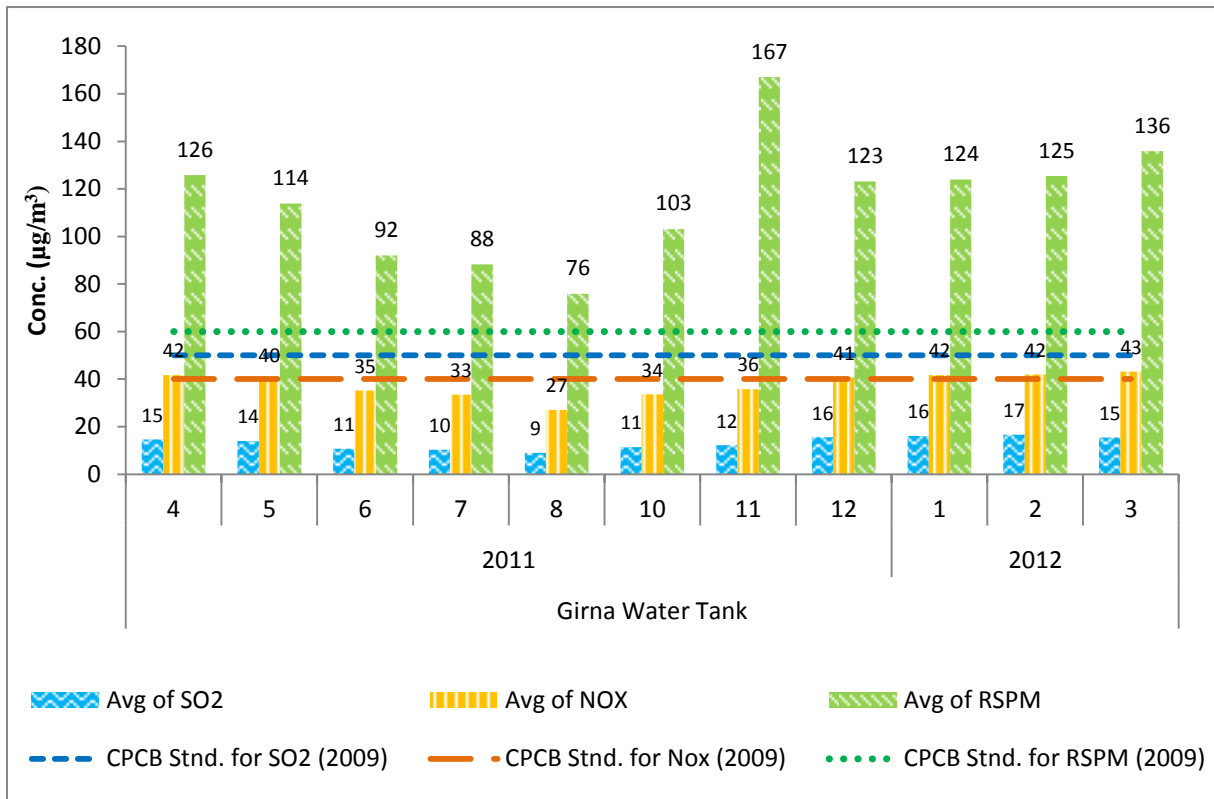


Figure No 109: Monthly average reading recorded at Girna Water Tank – Jalgaon

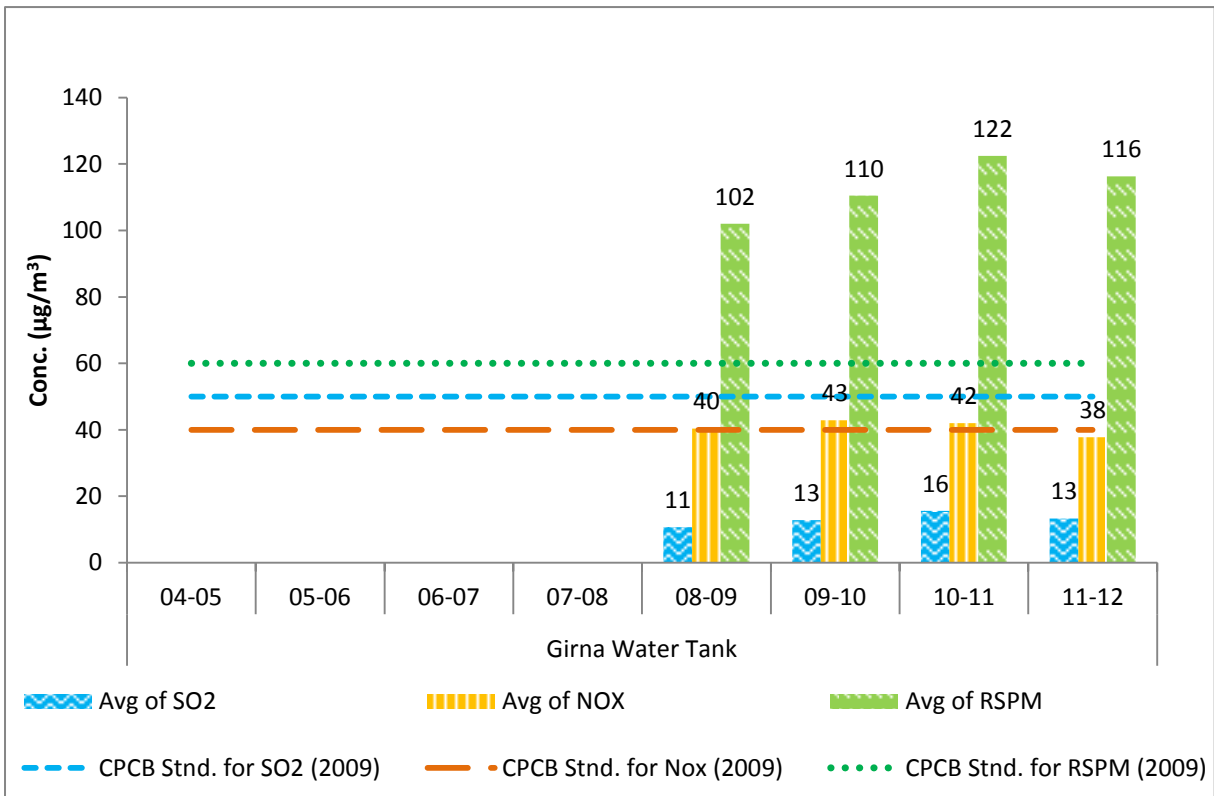


Figure No 110: Annual average trend of SO₂, NO_x and RSPM at Girna Water Tank – Jalgaon

Jalgaon - MIDC Jalgaon

Table No 108: Data for monthly average reading recorded at MIDC Jalgaon

FY	N	Monthly average ($\mu\text{g}/\text{m}^3$)		
		SO ₂	NO _x	RSPM
2011-12				
Apr	8	25	50	153
May	8	22	48	128
Jun	8	21	48	121
Jul	8	17	40	101
Aug	9	15	39	101
Sep	-	-	-	-
Oct	8	21	49	132
Nov	9	22	51	140
Dec	9	25	53	150
Jan	8	26	55	155
Feb	8	28	56	159
Mar	9	26	53	161
	Total N		% of exceedence	
	92	0.0	0.0	92.4

Table No 109: Data for annual average trend of SO₂, NO_x and RSPM at MIDC Jalgaon

Year	N	Annual average ($\mu\text{g}/\text{m}^3$)		
		SO ₂	NO _x	RSPM
<i>Annual Standards</i>		50	40	60
04-05	-	-	-	-
05-06	-	-	-	-
06-07	-	-	-	-
07-08	-	-	-	-
08-09	24	15	54	120
09-10	97	16	49	120
10-11	105	22	51	142
11-12	92	22	49	137

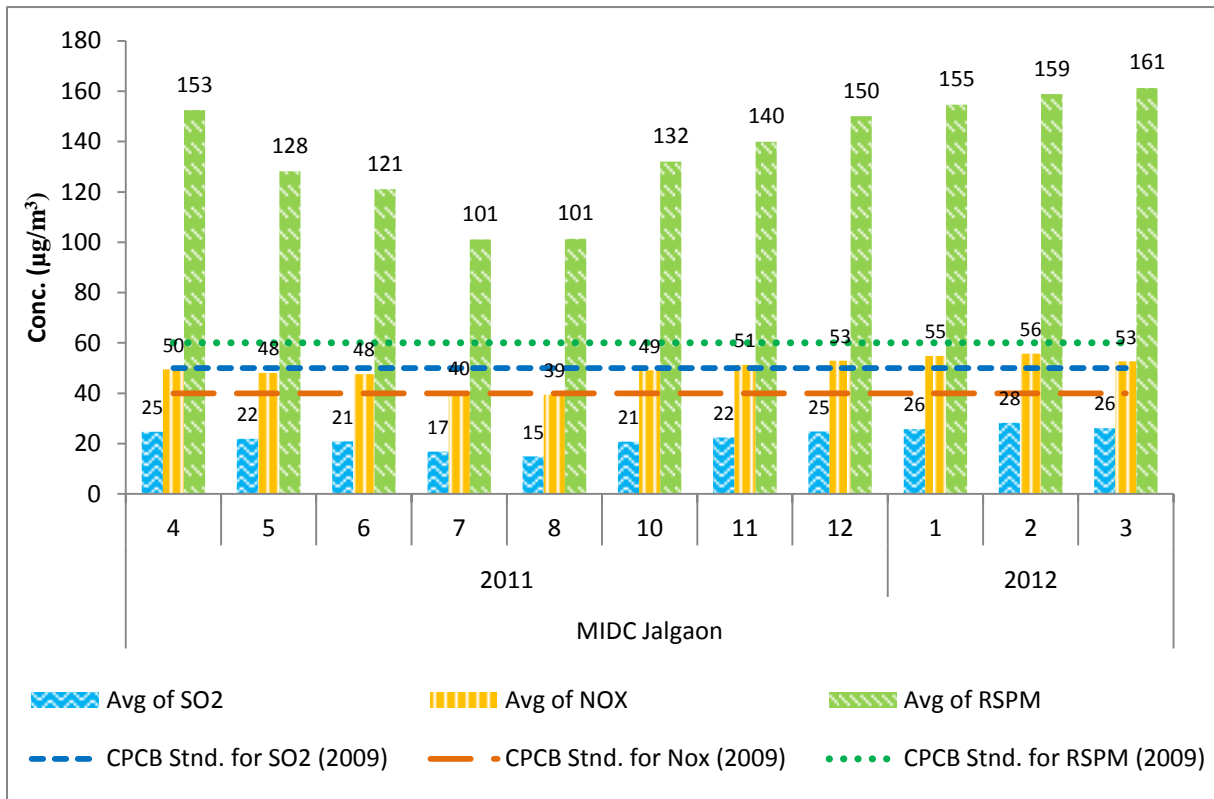


Figure No 111: Monthly average reading recorded at MIDC Jalgaon

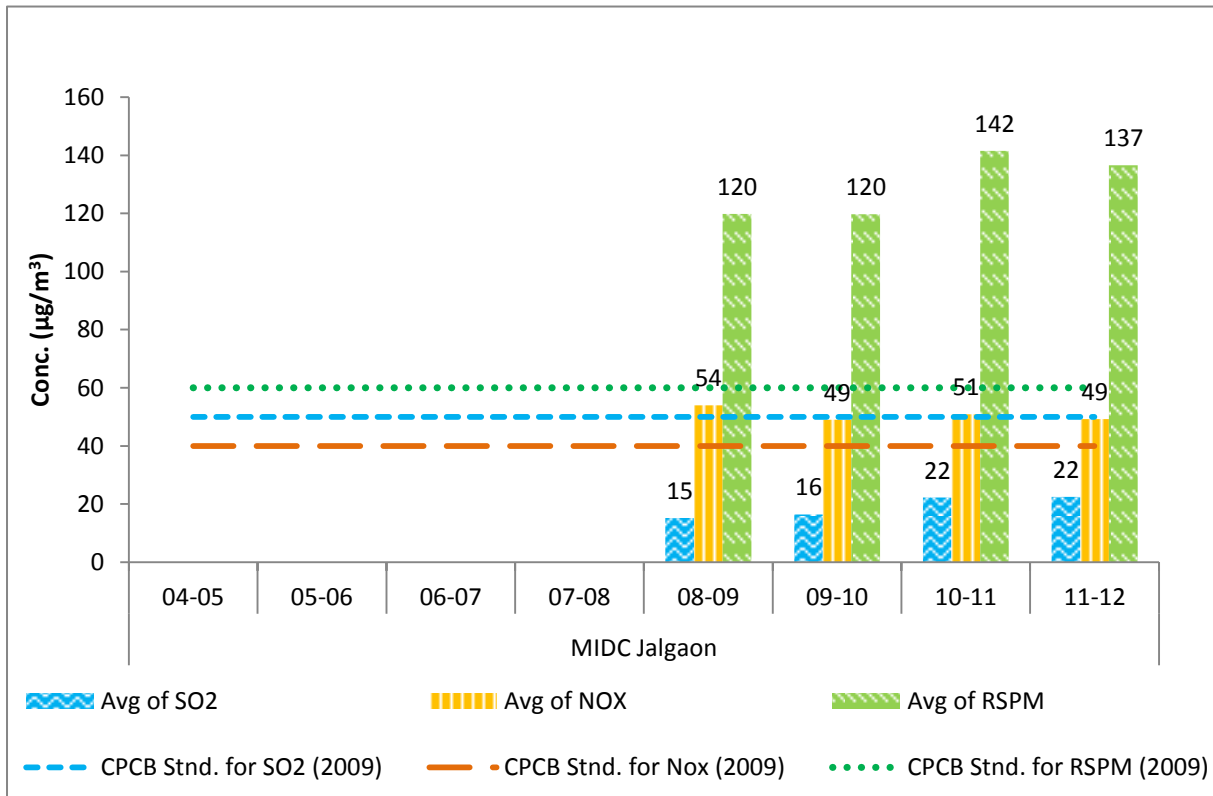


Figure No 112: Annual average trend of SO₂, NO_x and RSPM at MIDC Jalgaon

Jalgaon - Old B.J. Market

Table No 110: Data for monthly average reading recorded at Old B.J. Market – Jalgaon

FY	N	Monthly average ($\mu\text{g}/\text{m}^3$)		
		SO ₂	NO _x	RSPM
2011-12				
Apr	8	17	48	120
May	10	15	40	105
Jun	8	14	39	95
Jul	8	10	36	84
Aug	10	10	31	72
Sep	-	-	-	-
Oct	9	16	42	117
Nov	9	17	44	116
Dec	8	20	47	112
Jan	10	21	49	118
Feb	8	23	52	141
Mar	8	20	47	145
	Total N		% of exceedence	
	96	0.0	0.0	75.0

Table No 111: Data for annual average trend of SO₂, NO_x and RSPM at Old B.J. Market – Jalgaon

Year	N	Annual average ($\mu\text{g}/\text{m}^3$)		
		SO ₂	NO _x	RSPM
<i>Annual Standards</i>		50	40	60
04-05	-	-	-	-
05-06	-	-	-	-
06-07	-	-	-	-
07-08	-	-	-	-
08-09	31	14	48	117
09-10	104	15	45	109
10-11	95	18	45	122
11-12	96	16	43	111

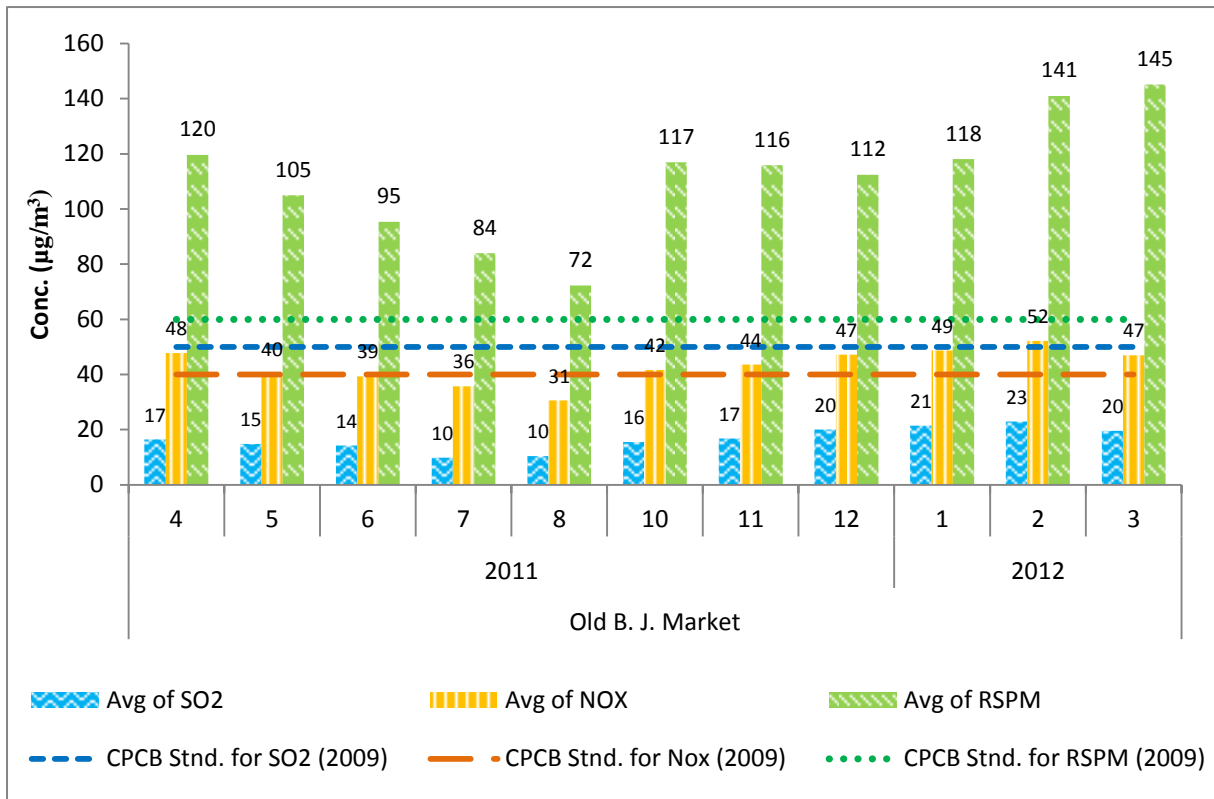


Figure No 113: Monthly average reading recorded at Old B.J. Market – Jalgaon

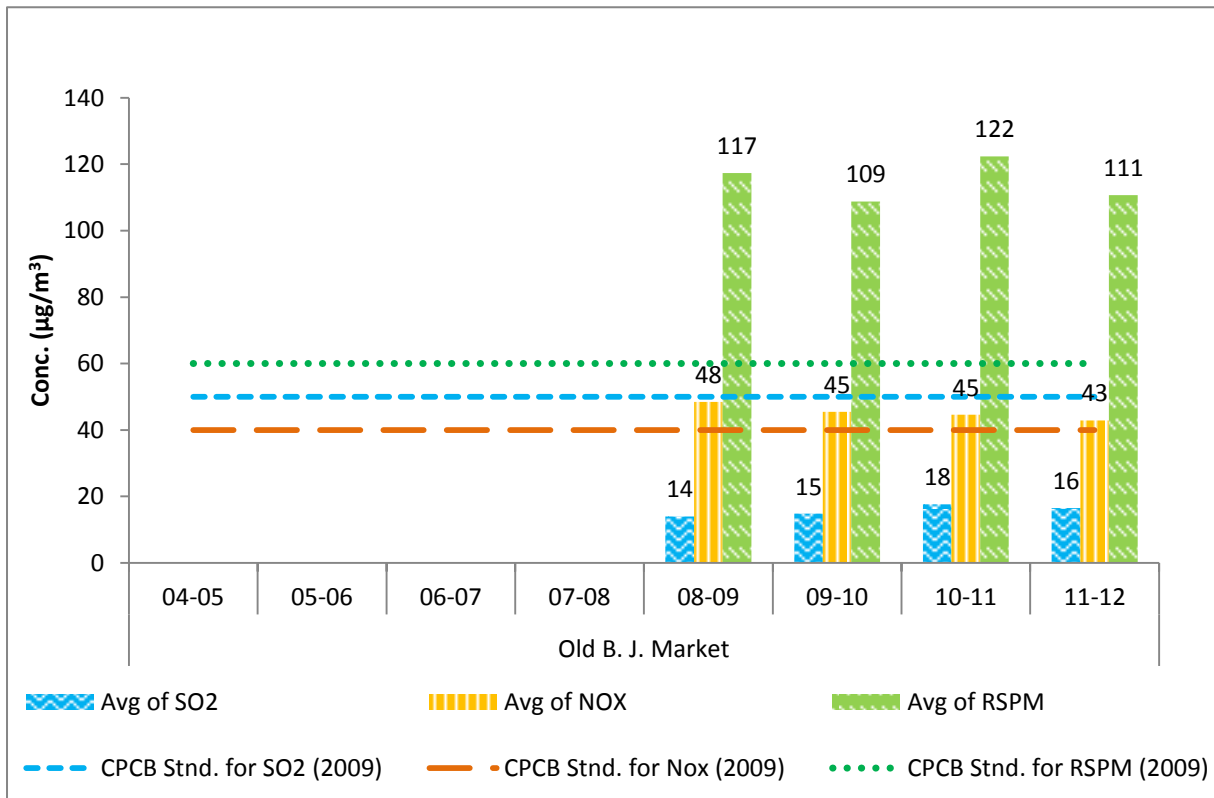


Figure No 114: Annual average trend of SO₂, NO_x and RSPM at Old B.J. Market – Jalgaon

Nashik - MIDC Satpur - VIP

Table No 112: Data for monthly average reading recorded at MIDC Satpur - VIP – Nashik

FY	N	Monthly average ($\mu\text{g}/\text{m}^3$)		
		SO ₂	NO _x	RSPM
2011-12				
Apr	9	29	30	87
May	8	31	32	102
Jun	9	30	30	62
Jul	9	24	27	66
Aug	9	24	26	50
Sep	8	23	24	62
Oct	9	25	27	75
Nov	9	24	27	128
Dec	9	23	30	127
Jan	8	25	31	163
Feb	9	22	27	130
Mar	9	24	27	129
Total N			% of exceedence	
105		0.0	0.0	41.0

Table No 113: Data for annual average trend of SO₂, NO_x and RSPM at MIDC Satpur - VIP – Nashik

Year	N	Annual average ($\mu\text{g}/\text{m}^3$)		
		SO ₂	NO _x	RSPM
<i>Annual Standards</i>		50	40	60
04-05	25	36	27	90
05-06	68	33	28	98
06-07	101	34	28	58
07-08	101	41	34	52
08-09	104	30	27	91
09-10	104	23	29	85
10-11	103	23	25	70
11-12	105	25	28	98

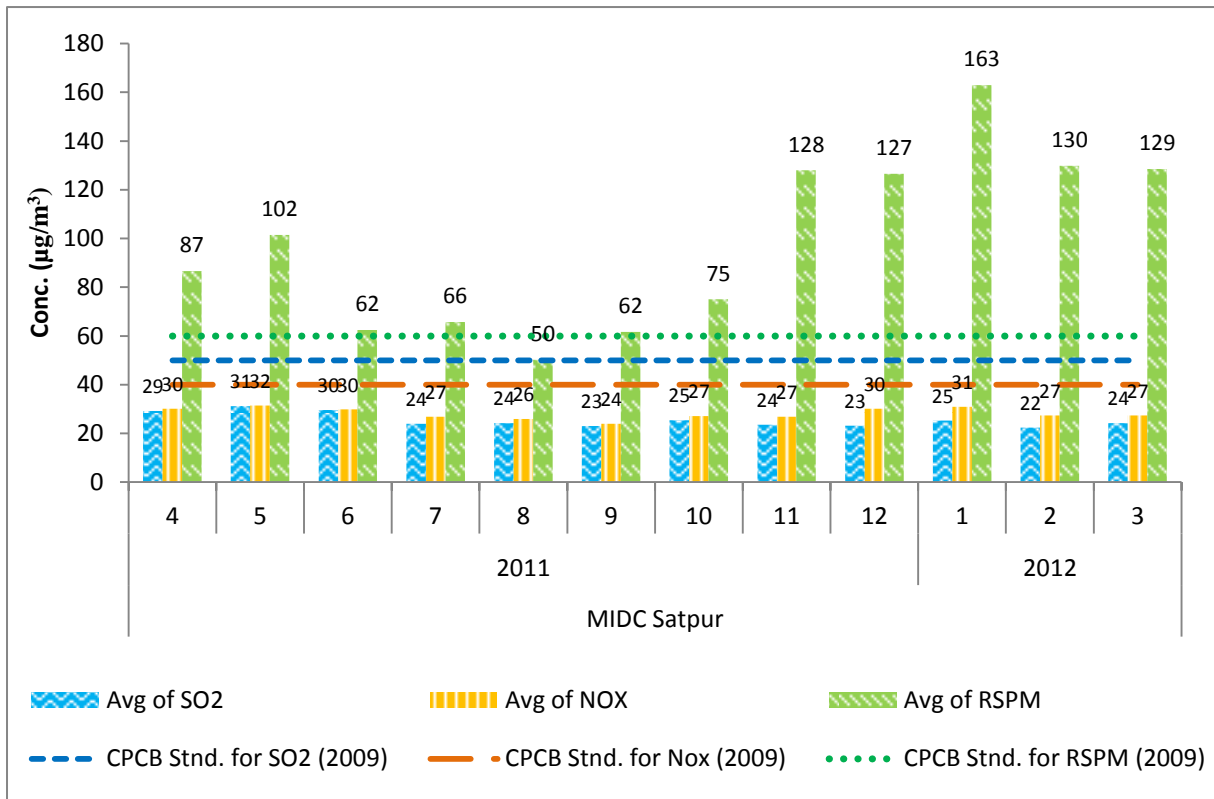


Figure No 115: Monthly average reading recorded at MIDC Satpur - VIP – Nashik

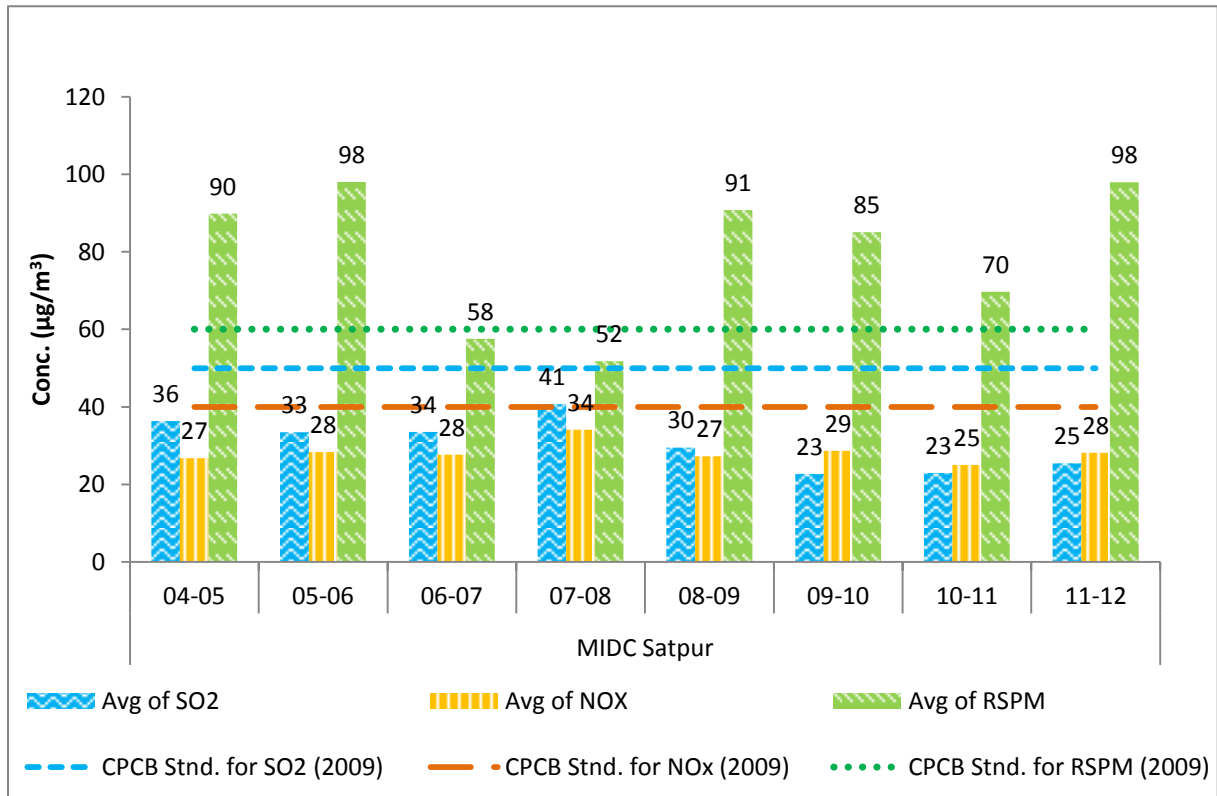


Figure No 116: Annual average trend of SO₂, NO_x and RSPM at MIDC Satpur - VIP – Nashik

Nashik - RTO Colony

Table No 114: Data for monthly average reading recorded at RTO Colony – Nashik

FY	N	Monthly average ($\mu\text{g}/\text{m}^3$)		
		SO ₂	NO _x	RSPM
2011-12				
Apr	9	28	30	90
May	9	31	31	88
Jun	8	28	30	57
Jul	9	23	26	62
Aug	9	24	25	73
Sep	9	21	22	59
Oct	8	26	27	71
Nov	9	23	26	122
Dec	9	22	29	139
Jan	9	23	31	158
Feb	8	22	27	116
Mar	9	23	27	132
	Total N		% of exceedence	
	105	0.0	0.0	46.7

Table No 115: Data for annual average trend of SO₂, NO_x and RSPM at RTO Colony – Nashik

Year	N	Annual average ($\mu\text{g}/\text{m}^3$)		
		SO ₂	NO _x	RSPM
		50	40	60
<i>Annual Standards</i>				
04-05	25	33	25	79
05-06	69	29	25	92
06-07	86	32	26	51
07-08	94	34	27	42
08-09	104	26	25	88
09-10	94	21	29	81
10-11	104	21	23	75
11-12	105	24	28	98

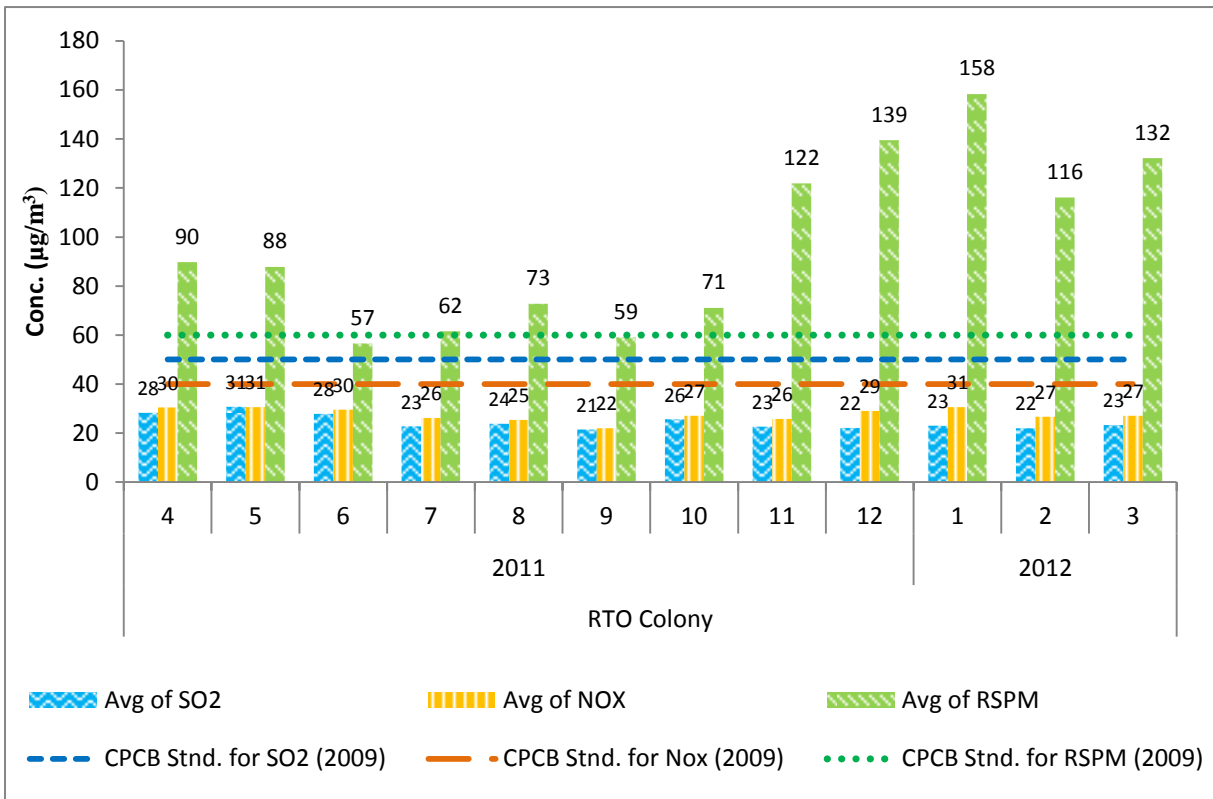


Figure No 117: Monthly average reading recorded at RTO Colony – Nashik

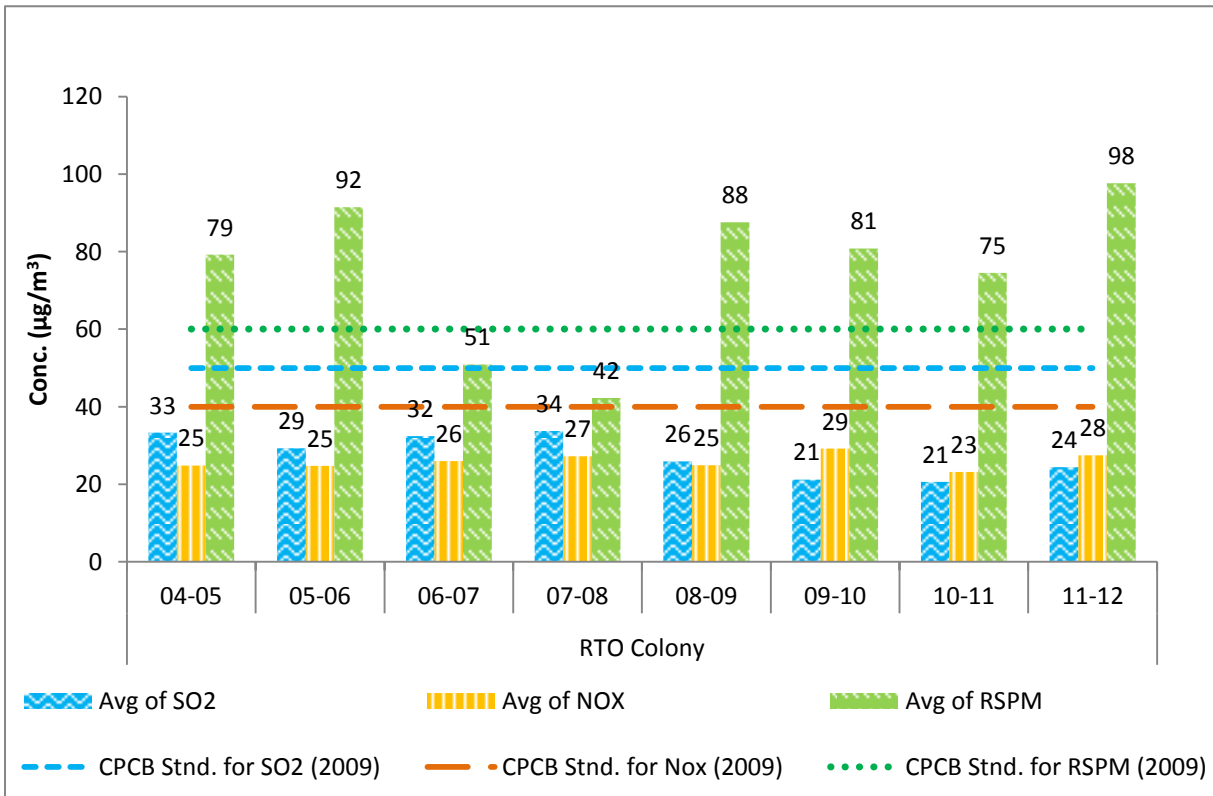


Figure No 118: Annual average trend of SO₂, NO_x and RSPM at RTO Colony – Nashik

Nashik - SRO Office

Table No 116: Monthly average reading recorded at SRO Office – Nashik

FY	N	Monthly average ($\mu\text{g}/\text{m}^3$)		
		SO ₂	NO _x	RSPM
2011-12				
Apr	26	28	30	114
May	22	30	32	104
Jun	-	-	-	-
Jul	-	-	-	-
Aug	12	22	25	53
Sep	25	21	23	68
Oct	20	26	28	89
Nov	26	22	26	128
Dec	25	21	27	137
Jan	27	24	30	155
Feb	25	21	27	116
Mar	24	22	27	133
	Total N		% of exceedence	
	232	0.0	0.0	57.3

Table No 117: Data for annual average trend of SO₂, NO_x and RSPM at SRO Office – Nashik

Year	N	Annual average ($\mu\text{g}/\text{m}^3$)		
		SO ₂	NO _x	RSPM
		50	40	60
<i>Annual Standards</i>				
04-05	167	19	31	69
05-06	319	14	27	78
06-07	276	16	27	102
07-08	290	17	26	114
08-09	253	23	29	104
09-10	297	21	27	86
10-11	294	20	23	85
11-12	232	24	28	114

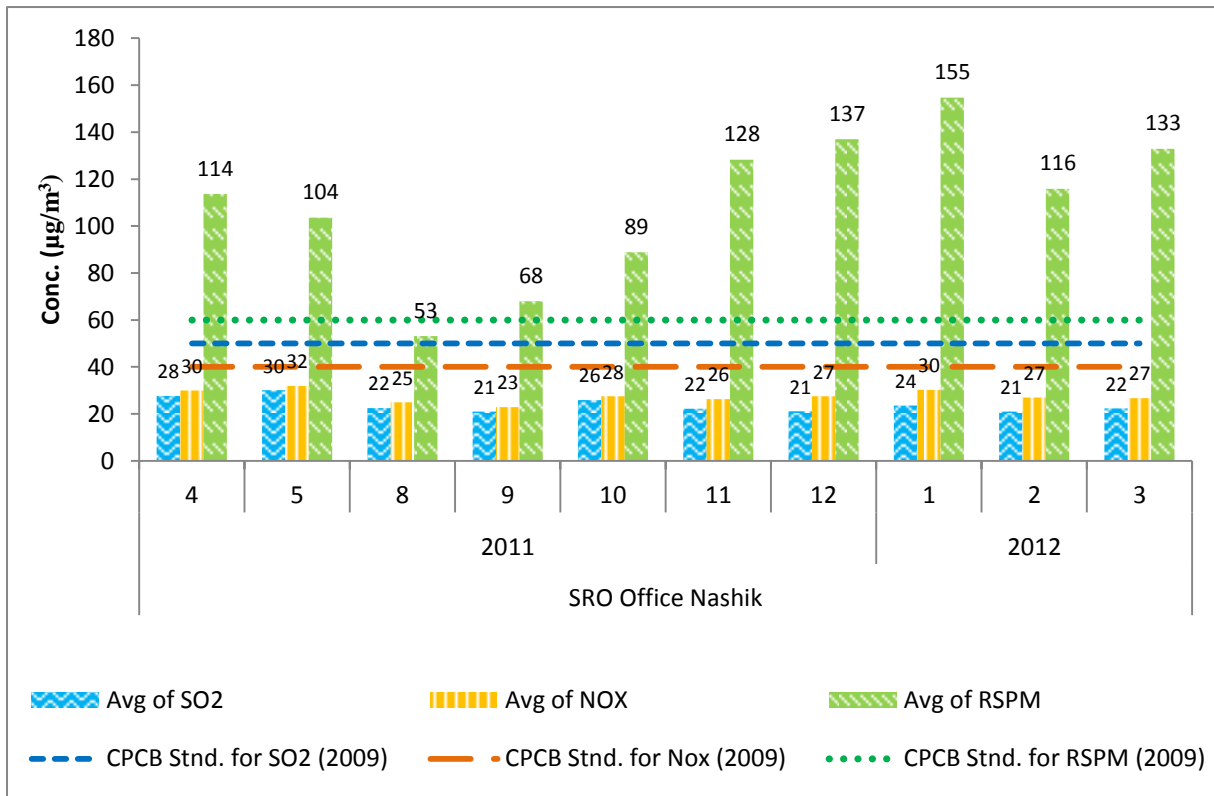


Figure No 119: Monthly average reading recorded at SRO Office – Nashik

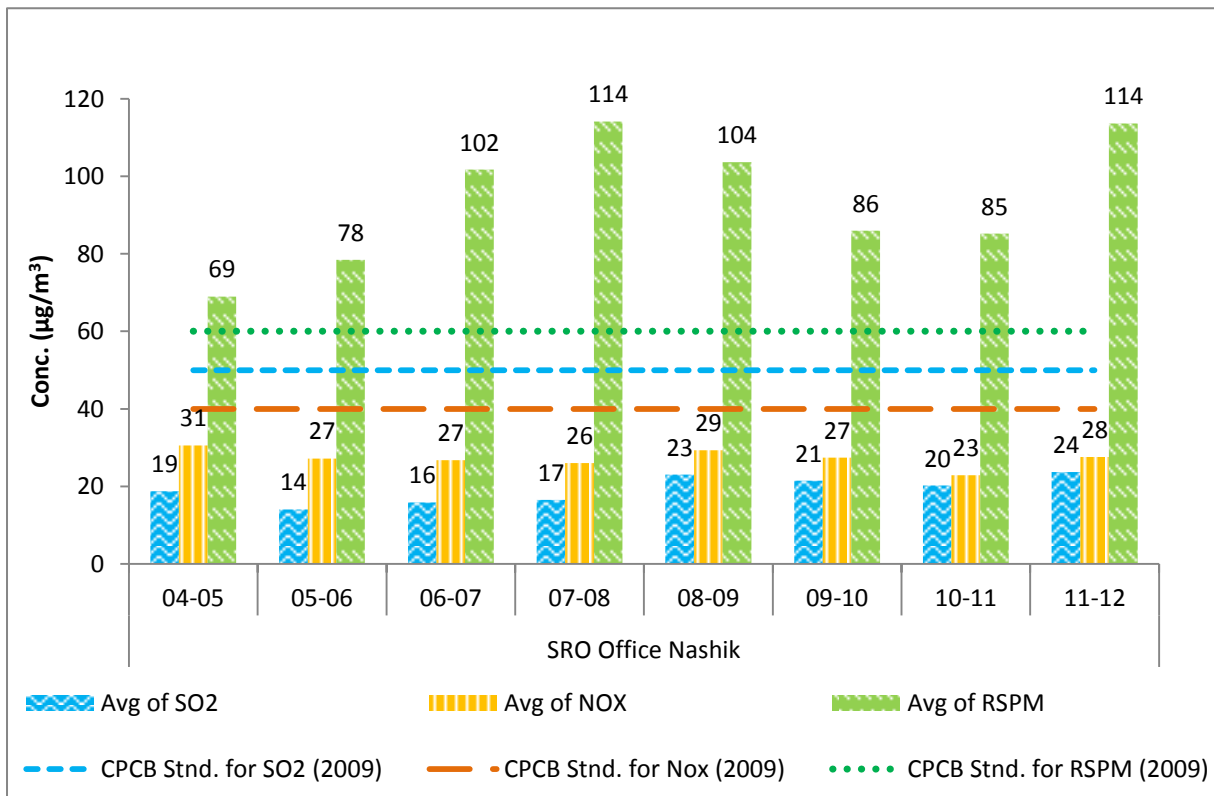
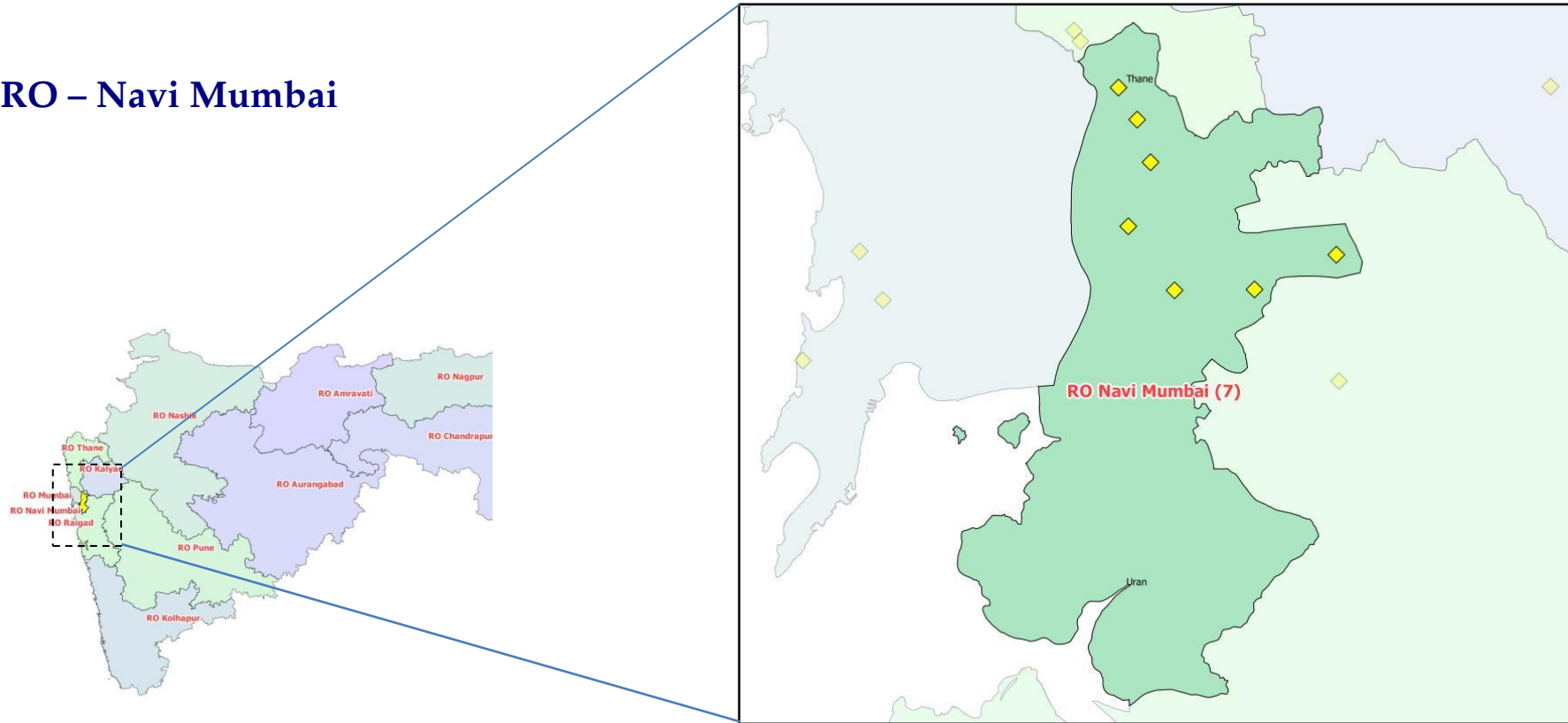


Figure No 120: Annual average trend of SO₂, NO_x and RSPM at SRO Office – Nashik

RO – Navi Mumbai



Region	Program	Station Codes	Station	Frequency	Latitude	Longitude
Navi Mumbai	CAAQMS		Airoli	ContinuousMonitoring	19° 09.357'	72° 59.590'
			Vashi	Continuous Monitoring	19° 3.341'	72° 55.325'
	NAMP	493	MPCB-Nirmal Bhavan, Mahape	Two Days In A Week	19° 06.816'	73° 00.669'
		492	Nerul - DY Patil	Two Days In A Week	19° 2.468'	73° 1.491'
		491	Rabale	Two Days In A Week	19° 8.254'	73° 0.219'
Taloja	NAMP	494	Kharghar - CIDCO Nodal Office	Two Days In A Week	19° 02.490'	73° 04.196'
		496	MIDC Taloja	Two Days In A Week	19° 03.667'	73° 06.977'

Navi Mumbai - Airoli

Table No 118: Data for monthly average reading recorded at Airoli – Navi Mumbai

FY	N	Monthly average ($\mu\text{g}/\text{m}^3$)		
		SO ₂	NO _x	RSPM
2011-12				
Apr	30	25	70	136
May	21	22	44	84
Jun	-	-	-	-
Jul	-	-	-	-
Aug	10	9	100	76
Sep	29	7	57	98
Oct	29	10	72	150
Nov	24	8	57	192
Dec	26	8	61	248
Jan	25	10	93	238
Feb	28	15	81	240
Mar	28	14	125	274
	Total N		% of exceedence	
	250	0.0	30.0	80.4

Table No 119: Data for annual average trend of SO₂, NO_x and RSPM at Airoli – Navi Mumbai

Year	N	Annual average ($\mu\text{g}/\text{m}^3$)		
		SO ₂	NO _x	RSPM
<i>Annual Standards</i>		50	40	60
04-05	-	-	-	-
05-06	-	-	-	-
06-07	-	-	-	-
07-08	-	-	-	-
08-09	80	31	112	87
09-10	335	23	89	120
10-11	343	27	67	128
11-12	250	13	75	181

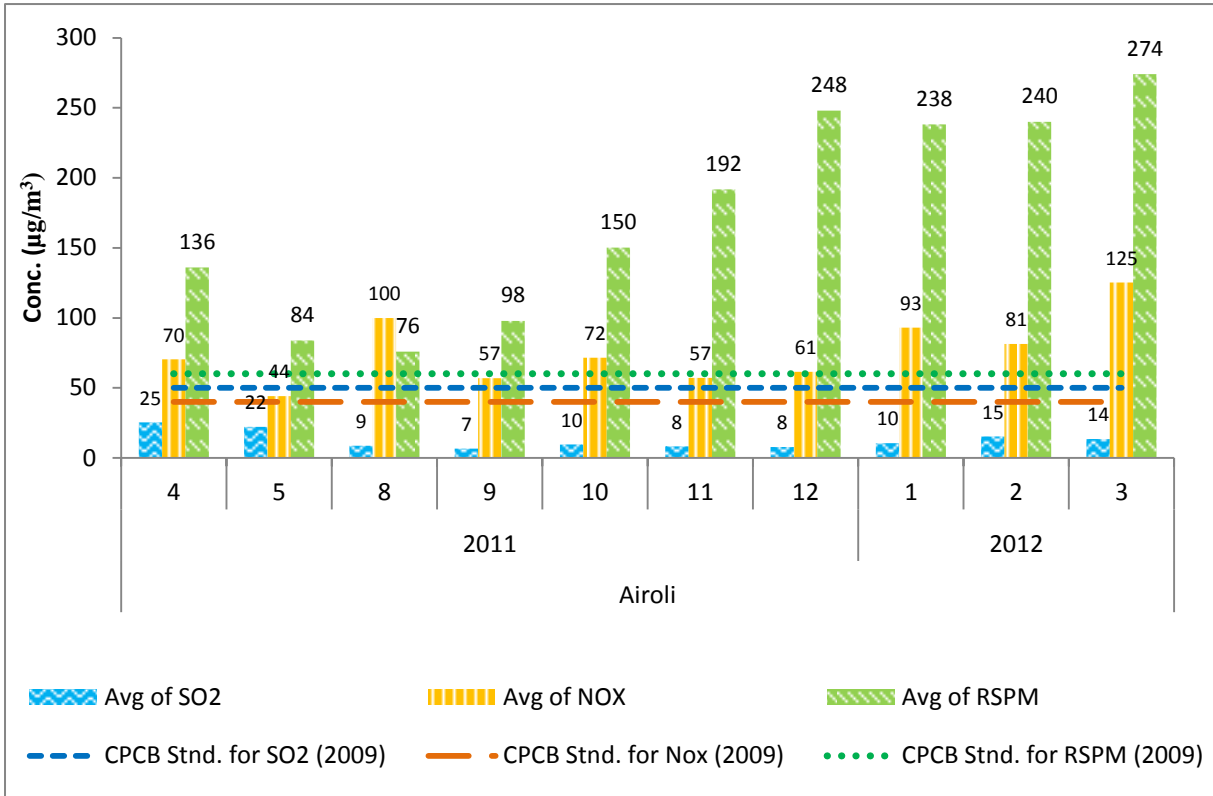


Figure No 121: Monthly average reading recorded at Airoli – Navi Mumbai

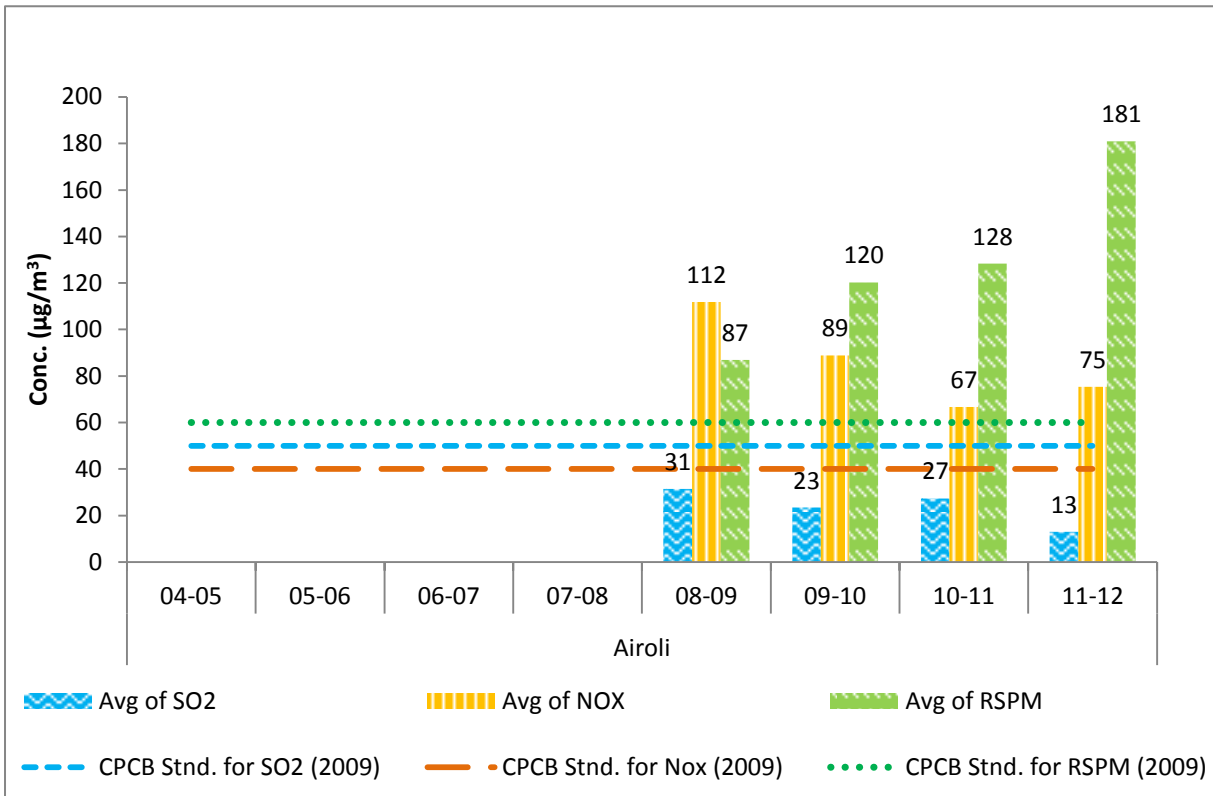


Figure No 122: Annual average trend of SO₂, NO_x and RSPM at Airoli – Navi Mumbai

Navi Mumbai - Vashi

Table No 120: Data for monthly average reading recorded at Vashi– Navi Mumbai

FY	N	Monthly average ($\mu\text{g}/\text{m}^3$)		
		SO ₂	NO _x	RSPM
2011-12				
Apr	21	25	56	88
May	18	11	28	60
Jun	-	-	-	-
Jul	-	-	-	-
Aug	9	27	21	38
Sep	18	7	25	25
Oct	13	14	27	37
Nov	17	16	64	148
Dec	22	3	67	132
Jan	20	16	39	154
Feb	24	29	37	160
Mar	24	36	45	175
	Total N		% of exceedence	
	186	0.0	4.8	58.1

Table No 121: Data for annual average trend of SO₂, NO_x and RSPM at Vashi – Navi Mumbai

Year	N	Annual average ($\mu\text{g}/\text{m}^3$)		
		SO ₂	NO _x	RSPM
<i>Annual Standards</i>		50	40	60
04-05	-	-	-	-
05-06	-	-	-	-
06-07	137	62	71	101
07-08	269	50	50	93
08-09	289	22	51	124
09-10	329	26	57	96
10-11	296	19	45	92
11-12	186	19	43	111
NAMP				

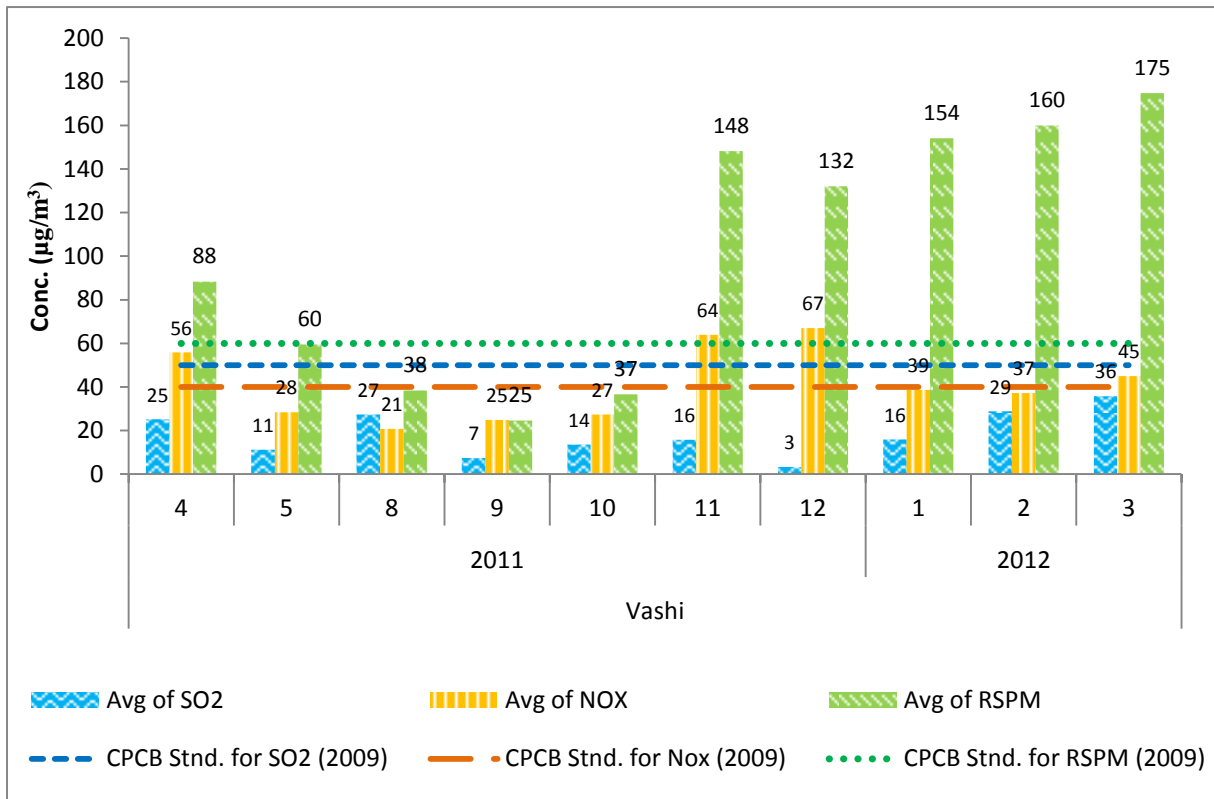


Figure No 123: Monthly average reading recorded at Vashi- Navi Mumbai

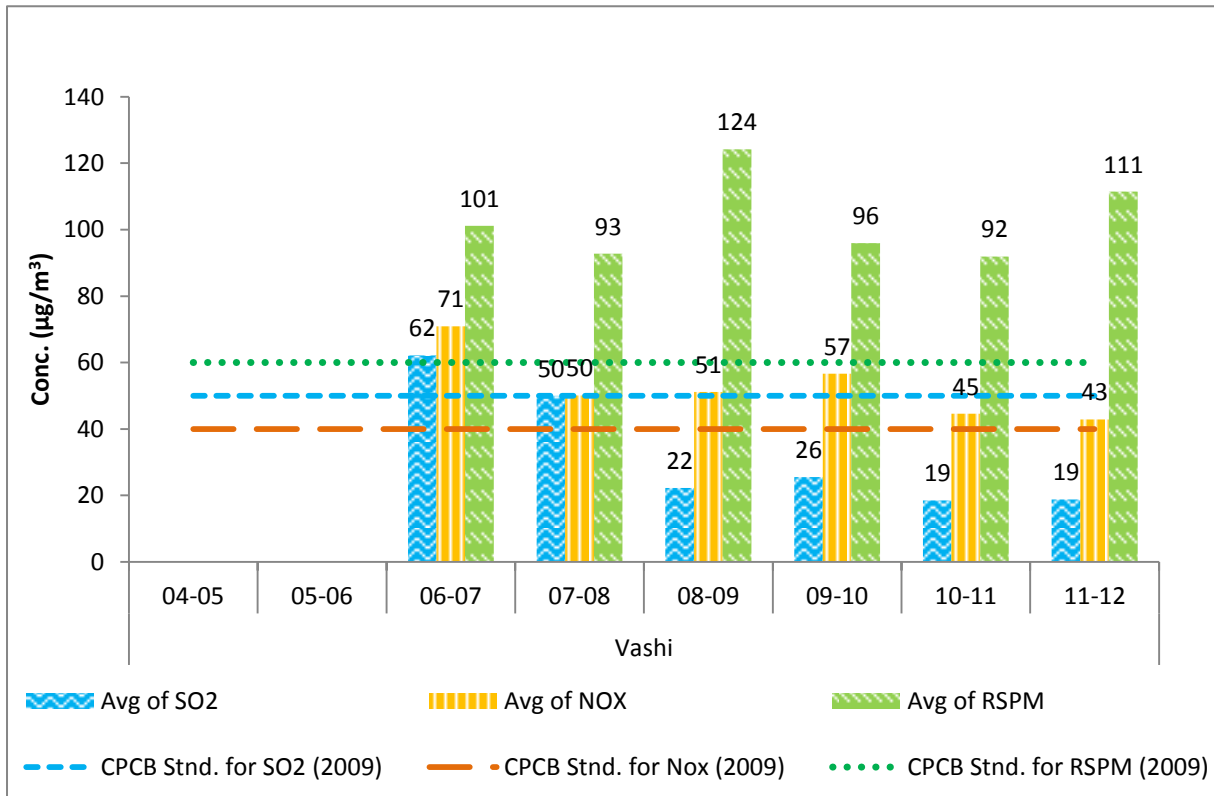


Figure No 124: Annual average trend of SO₂, NO_x and RSPM at Vashi – Navi Mumbai

Navi Mumbai - MPCB-Nirmal Bhavan, Mahape

Table No 122: Data for monthly average reading recorded at MPCB-Nirmal Bhavan, Mahape– Navi Mumbai

FY	N	Monthly average ($\mu\text{g}/\text{m}^3$)		
		SO ₂	NO _x	RSPM
2011-12				
Apr	-	-	-	-
May	-	-	-	-
Jun	-	-	-	-
Jul	7	13	37	79
Aug	9	12	37	61
Sep	-	-	-	-
Oct	9	19	45	107
Nov	9	19	45	127
Dec	9	19	49	132
Jan	8	18	49	154
Feb	9	17	41	136
Mar	9	19	46	258
	Total N		% of exceedence	
	69	0.0	0.0	63.8

Table No 123: Data for annual average trend of SO₂, NO_x and RSPM at MPCB-Nirmal Bhavan, Mahape – Navi Mumbai

Year	N	Annual average ($\mu\text{g}/\text{m}^3$)		
		SO ₂	NO _x	RSPM
<i>Annual Standards</i>		50	40	60
04-05	-	-	-	-
05-06	-	-	-	-
06-07	57	37	27	106
07-08	98	17	32	94
08-09	88	22	43	131
09-10	105	15	42	95
10-11	90	22	41	101
11-12	69	17	44	133

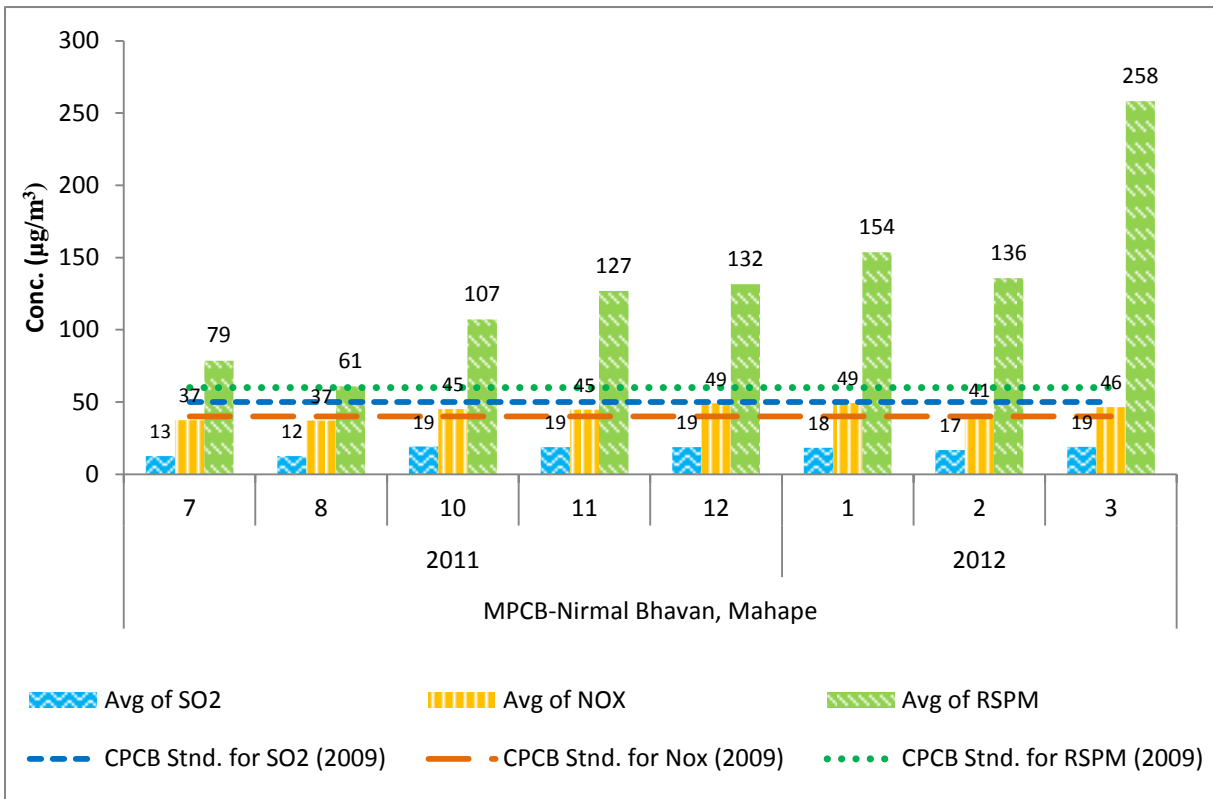


Figure No 125: Monthly average reading recorded at MPCB-Nirmal Bhavan, Mahape– Navi Mumbai

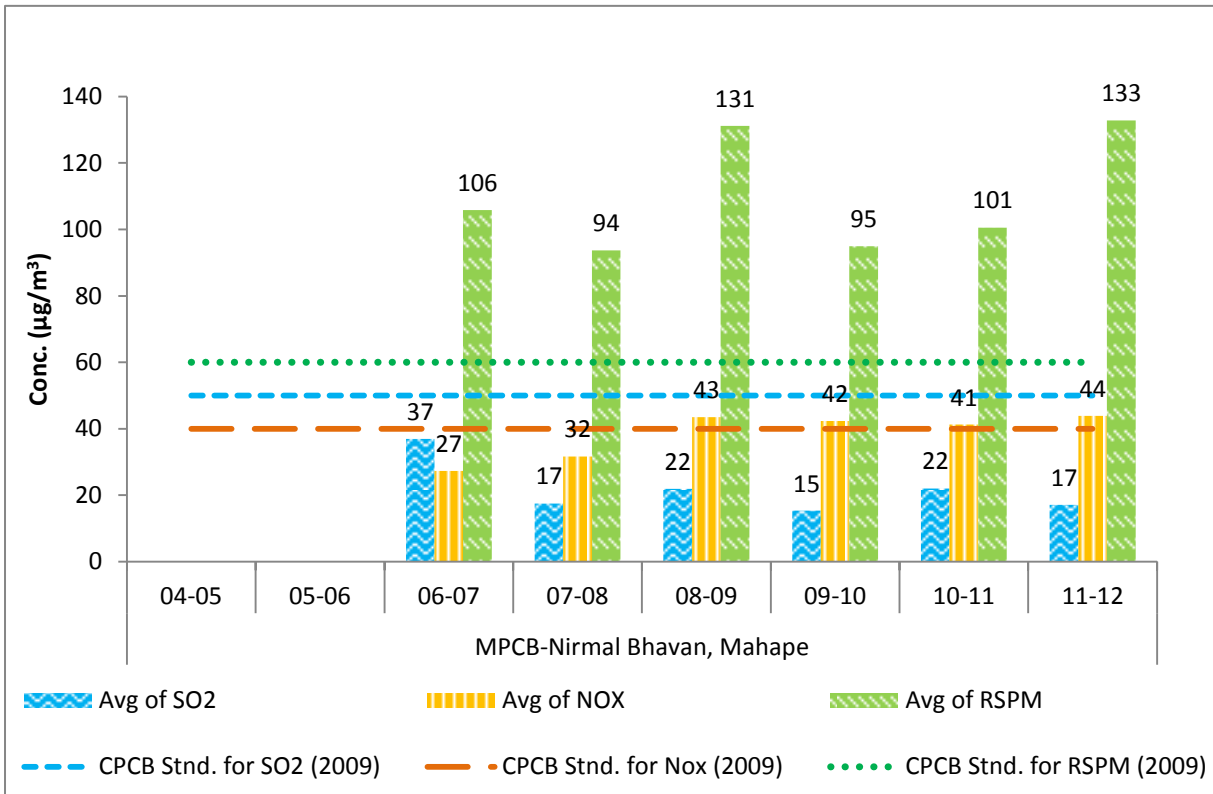


Figure No 126: Annual average trend of SO₂, NO_x and RSPM at MPCB-Nirmal Bhavan, Mahape – Navi Mumbai

Navi Mumbai - Nerul - DY Patil

Table No 124: Data for monthly average reading recorded at Nerul - DY Patil– Navi Mumbai

FY	N	Monthly average ($\mu\text{g}/\text{m}^3$)		
		SO ₂	NO _x	RSPM
2011-12				
Apr	8	19	52	123
May	8	18	50	55
Jun	17	15	45	66
Jul	8	10	33	80
Aug	7	9	34	47
Sep	-	-	-	-
Oct	9	18	43	138
Nov	8	16	39	145
Dec	8	15	45	177
Jan	8	16	45	166
Feb	8	16	42	179
Mar	9	16	44	163
	Total N		% of exceedence	
	98	0.0	0.0	56.1

Table No 125: Data for annual average trend of SO₂, NO_x and RSPM at Nerul - DY Patil– Navi Mumbai

Year	N	Annual average ($\mu\text{g}/\text{m}^3$)		
		SO ₂	NO _x	RSPM
<i>Annual Standards</i>		50	40	60
04-05	-	-	-	-
05-06	-	-	-	-
06-07	78	25	31	107
07-08	105	17	33	90
08-09	113	20	40	98
09-10	104	10	37	71
10-11	96	14	33	119
11-12	98	15	43	118

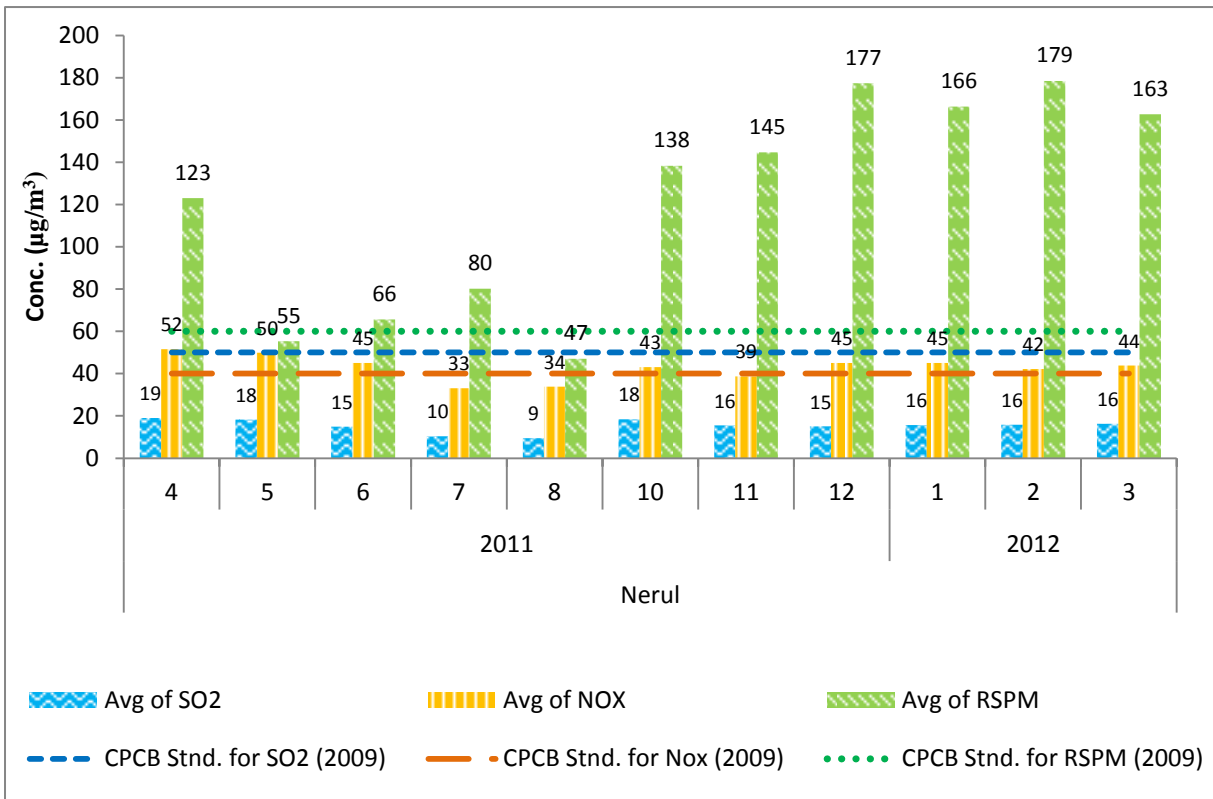


Figure No 127: Monthly average reading recorded at Nerul - DY Patil- Navi Mumbai

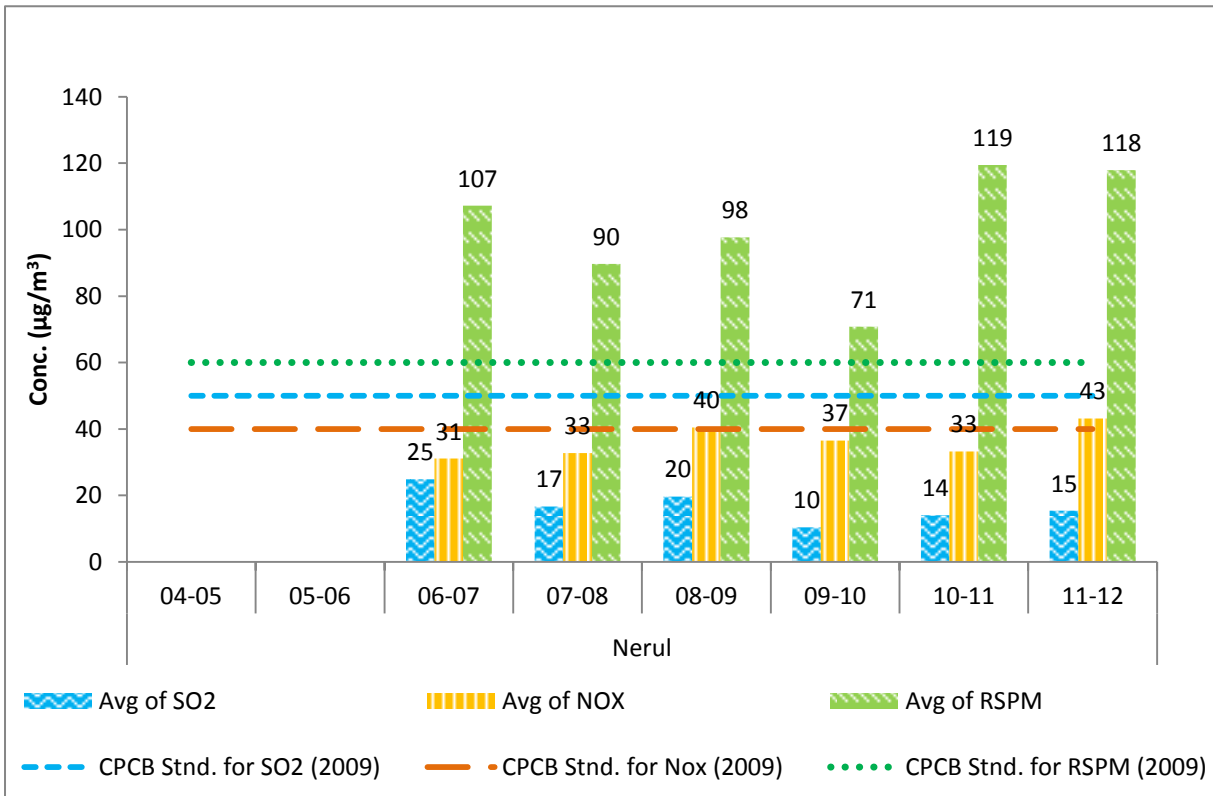


Figure No 128: Annual average trend of SO₂, NO_x and RSPM at Nerul - DY Patil- Navi Mumbai

Navi Mumbai - Rabale

Table No 126: Data for monthly average reading recorded at Rabale– Navi Mumbai

FY	N	Monthly average ($\mu\text{g}/\text{m}^3$)		
		SO ₂	NO _x	RSPM
2011-12				
Apr	9	22	52	79
May	9	23	55	79
Jun	8	16	47	32
Jul	11	12	37	63
Aug	9	11	36	47
Sep	-	-	-	-
Oct	7	22	52	142
Nov	9	19	45	105
Dec	9	18	47	125
Jan	9	20	49	150
Feb	8	19	48	128
Mar	9	20	50	165
	Total N		% of exceedence	
	97	0.0	1.0	38.1

Table No 127: Data for annual average trend of SO₂, NO_x and RSPM at Rabale– Navi Mumbai

Year	N	Annual average ($\mu\text{g}/\text{m}^3$)		
		SO ₂	NO _x	RSPM
<i>Annual Standards</i>		50	40	60
04-05	-	-	-	-
05-06	-	-	-	-
06-07	65	25	31	106
07-08	101	12	27	79
08-09	107	16	31	94
09-10	103	13	36	83
10-11	100	22	43	125
11-12	97	18	47	100

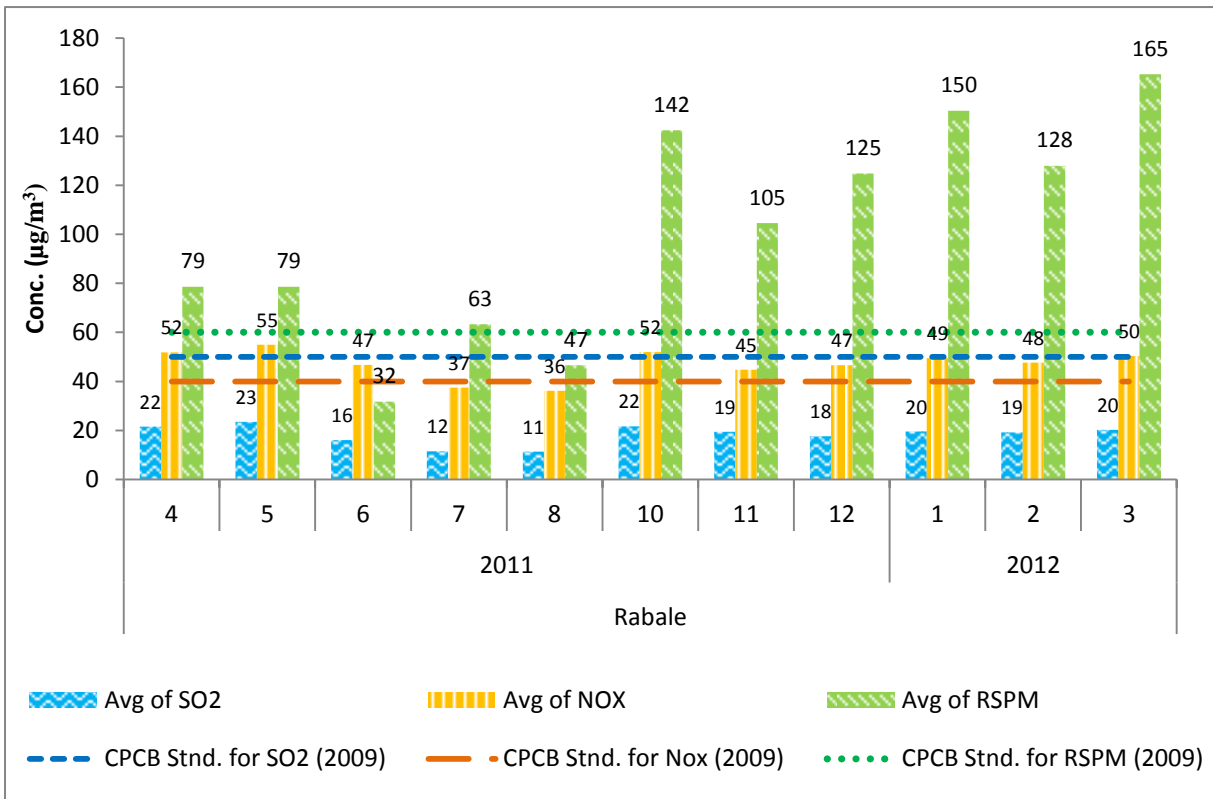


Figure No 129: Monthly average reading recorded at Rabale– Navi Mumbai

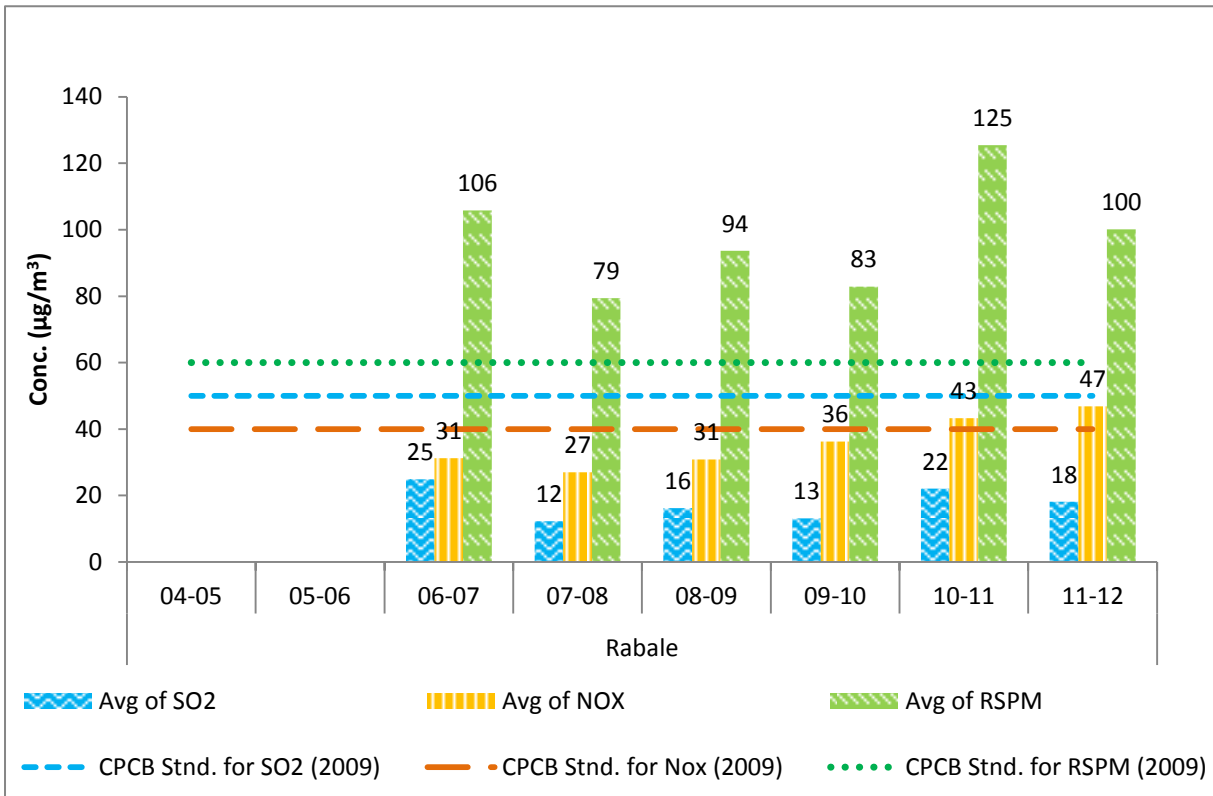


Figure No 130: Annual average trend of SO₂, NO_x and RSPM at Rabale– Navi Mumbai

Taloja - Kharghar - CIDCO Nodal Office

Table No 128: Data for monthly average readings recorded at Kharghar - CIDCO Nodal Office – Taloja

FY	N	Monthly average ($\mu\text{g}/\text{m}^3$)		
		SO ₂	NO _x	RSPM
2011-12				
Apr	9	19	46	120
May	9	17	50	89
Jun	8	16	45	52
Jul	9	11	38	85
Aug	9	11	38	63
Sep	-	-	-	-
Oct	7	18	39	117
Nov	9	16	41	144
Dec	9	17	42	163
Jan	9	17	45	165
Feb	8	16	42	180
Mar	9	17	47	165
Total N			% of exceedence	
95		0.0	0.0	61.1

Table No 129: Data for annual average trend of SO₂, NO_x and RSPM at Kharghar - CIDCO Nodal Office – Taloja

Year	N	Annual average ($\mu\text{g}/\text{m}^3$)		
		SO ₂	NO _x	RSPM
Annual Standards		50	40	60
04-05	-	-	-	-
05-06	-	-	-	-
06-07	76	18	33	96
07-08	94	10	31	108
08-09	94	13	40	115
09-10	111	10	35	75
10-11	105	17	37	122
11-12	95	16	43	122

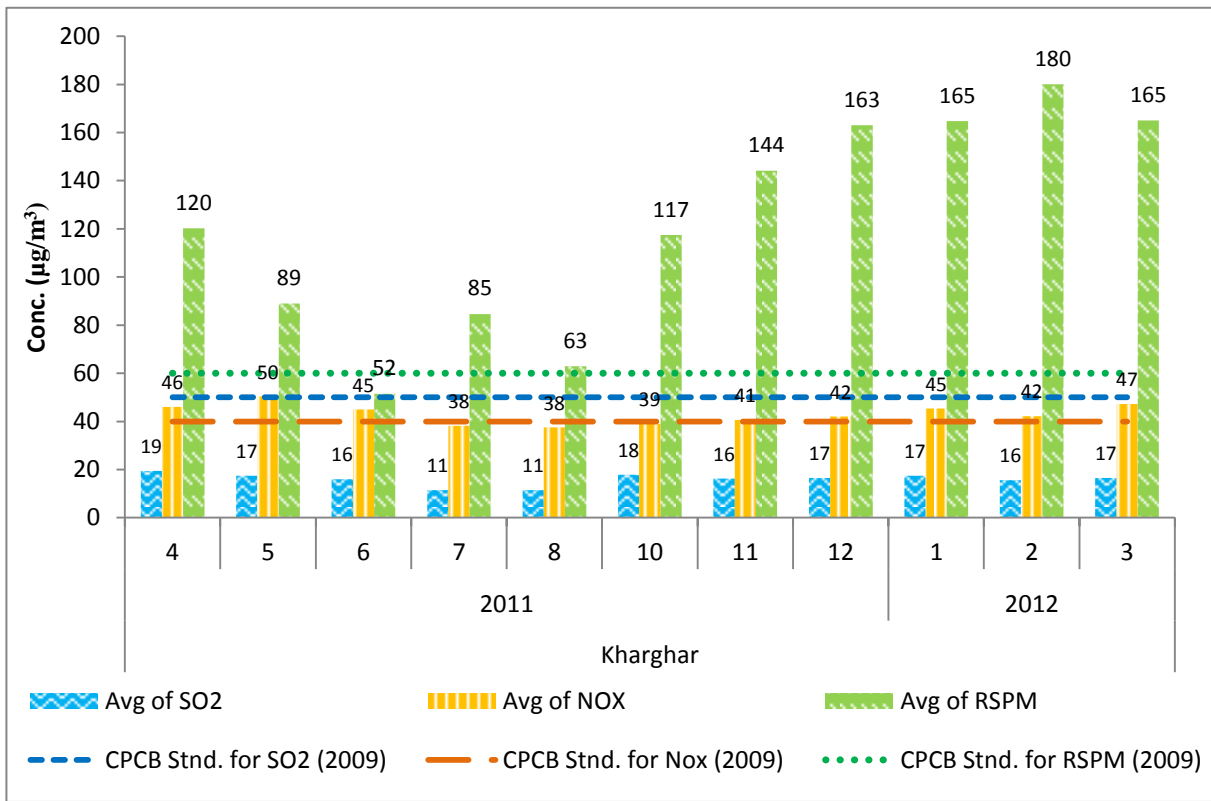


Figure No 131: Monthly average reading recorded at Kharghar - CIDCO Nodal Office – Taloja

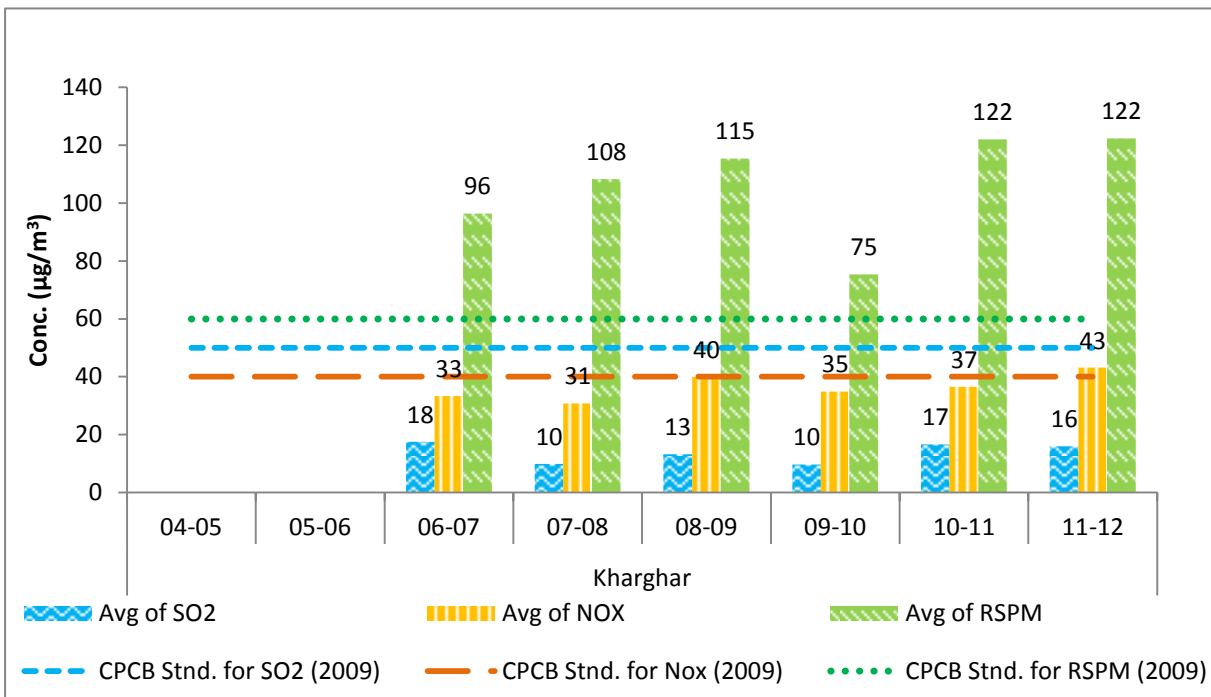


Figure No 132: Annual average trend of SO₂, NO_x and RSPM at Kharghar - CIDCO Nodal Office – Taloja

Taloja - MIDC Taloja

Table No 130: Data for monthly average reading recorded at MIDC Taloja

FY	N	Monthly average ($\mu\text{g}/\text{m}^3$)		
		SO ₂	NO _x	RSPM
2011-12				
Apr	8	26	57	245
May	9	26	59	182
Jun	9	18	51	125
Jul	8	14	42	71
Aug	8	13	42	56
Sep	-	-	-	-
Oct	9	23	53	106
Nov	8	20	48	173
Dec	9	20	53	150
Jan	8	20	51	173
Feb	8	19	48	203
Mar	9	21	52	149
Total N			% of exceedence	
93		0.0	1.1	74.2

Table No 131: Data for annual average trend of SO₂, NO_x and RSPM at MIDC Taloja

Year	N	Annual average ($\mu\text{g}/\text{m}^3$)		
		SO ₂	NO _x	RSPM
Annual Standards		50	40	60
04-05	-	-	-	-
05-06	-	-	-	-
06-07	65	32	40	101
07-08	101	22	39	113
08-09	107	29	46	241
09-10	100	23	55	200
10-11	106	27	48	194
11-12	93	20	51	148

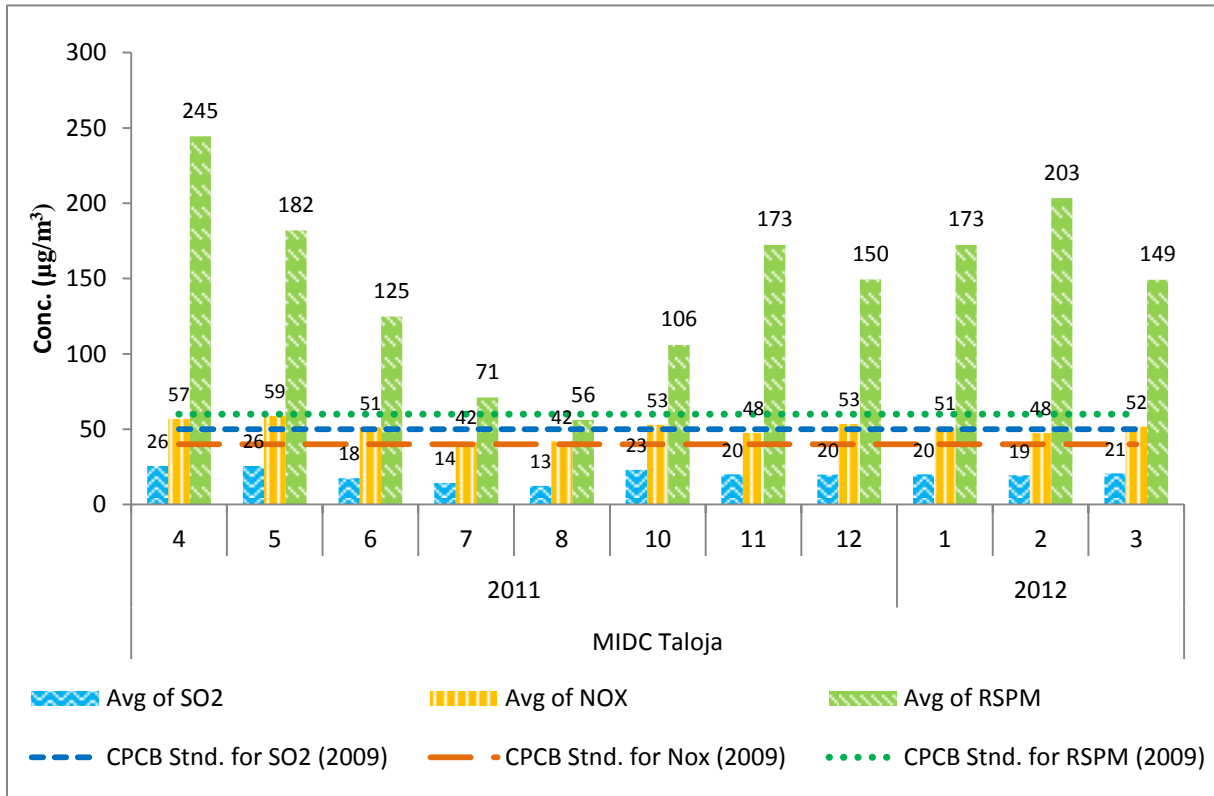


Figure No 133: Monthly average reading recorded at MIDC Taloja

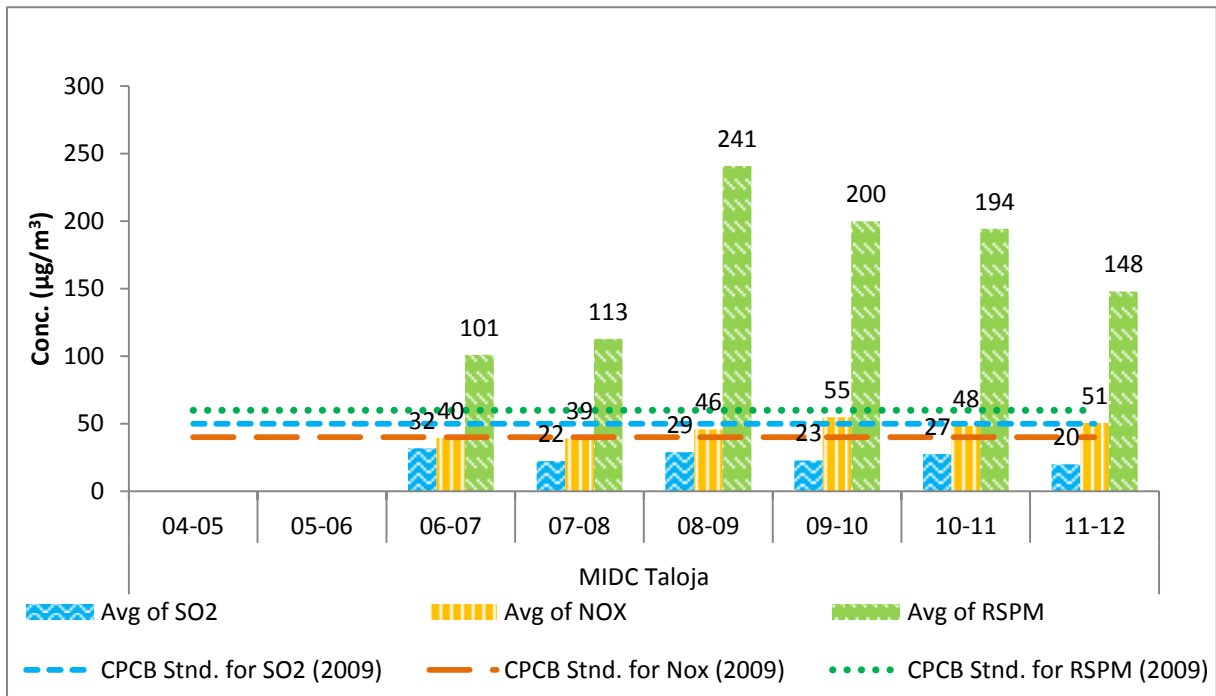
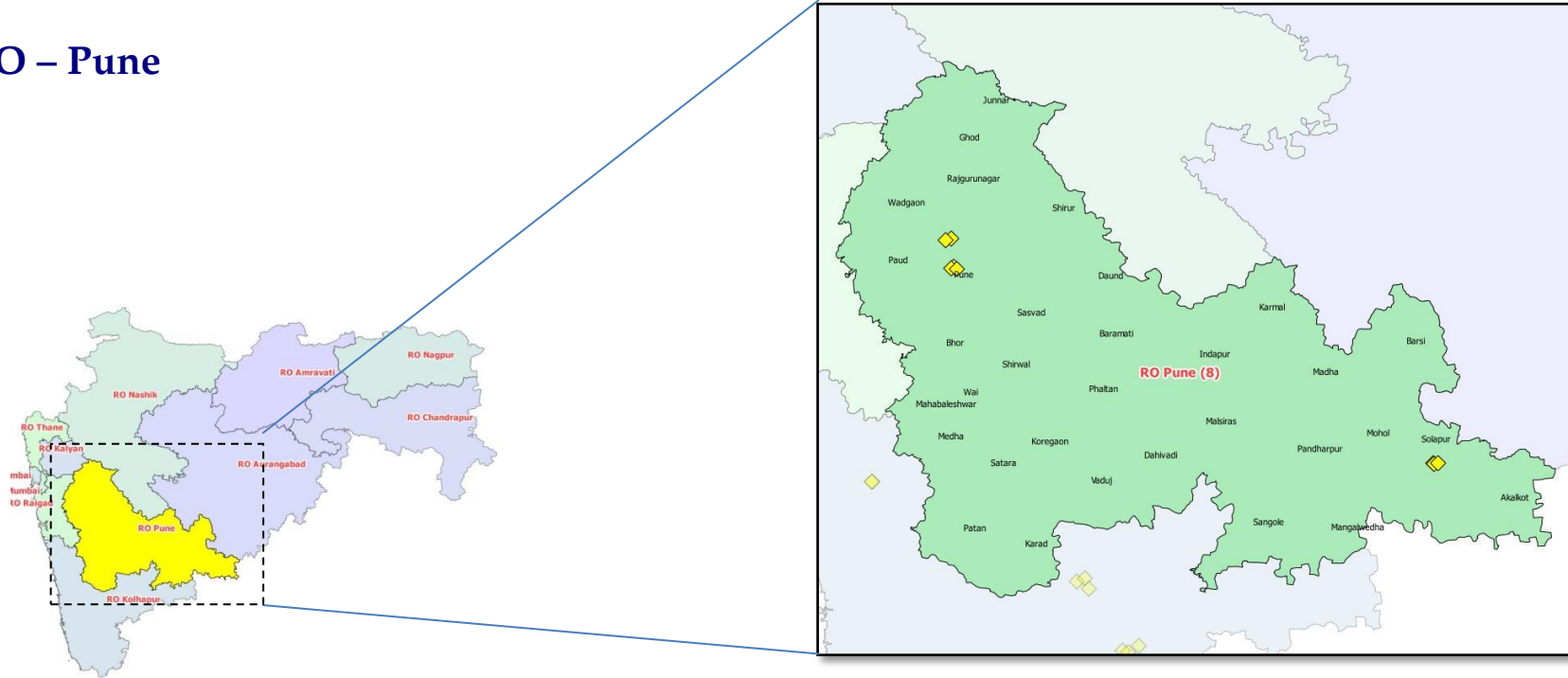


Figure No 134: Annual average trend of SO₂, NO_x and RSPM at MIDC Taloja

RO – Pune



Region	Program	Station Codes	Station	Frequency	Latitude	Longitude
Pune	CAAQMS	1	Karve Road - CAAQMS	Continuous Monitoring	18° 30.751	73° 50.377'
	NAMP	312	Bhosari	Two Days In A Week	18° 38.069'	73° 49.700'
		379	Nal Stop	Two Days In A Week	18° 30.420'	73° 49.653'
		381	Swargate	Two Days In A Week	18° 30.210'	73° 51.156'
		708	Pimpri-Chinchwad - BOB Building	Six days in a week	18° 37.683'	73° 48.283'
Solapur	CAAQMS	6	Solapur	Continuous Monitoring	17° 40.119'	75° 54.087'
	NAMP	300	Saat Rasta- Chithale Clinic	Two Days In A Week	17° 39.960'	75° 54.390'
		299	WIT Campus	Two Days In A Week	17° 40.110'	75° 55.321'

Pune - Karve Road- CAAQMS

Table No 132: Data for monthly average reading recorded at Karve Road- CAAQMS- Pune

FY	N	Monthly average ($\mu\text{g}/\text{m}^3$)		
		SO ₂	NO _x	RSPM
2011-12				
Apr	29	7	47	159
May	30	5	15	125
Jun	28	5	33	84
Jul	31	5	46	71
Aug	31	5	49	59
Sep	25	6	55	74
Oct	31	13	87	123
Nov	29	17	133	155
Dec	30	17	75	199
Jan	29	15	0	153
Feb	28	20	0	177
Mar	30	20	48	195
	Total N		% of exceedence	
	351	0.0	21.7	65.0

Table No 133: Data for annual average trend of SO₂, NO_x and RSPM at Karve Road- CAAQMS- Pune

Year	N	Annual average ($\mu\text{g}/\text{m}^3$)		
		SO ₂	NO _x	RSPM
<i>Annual Standards</i>		50	40	60
04-05	-	-	-	-
05-06	-	-	-	-
06-07	-	-	-	-
07-08	247	13	43	71
08-09	266	25	39	121
09-10	280	11	35	109
10-11	354	12	39	128
11-12	351	11	49	131

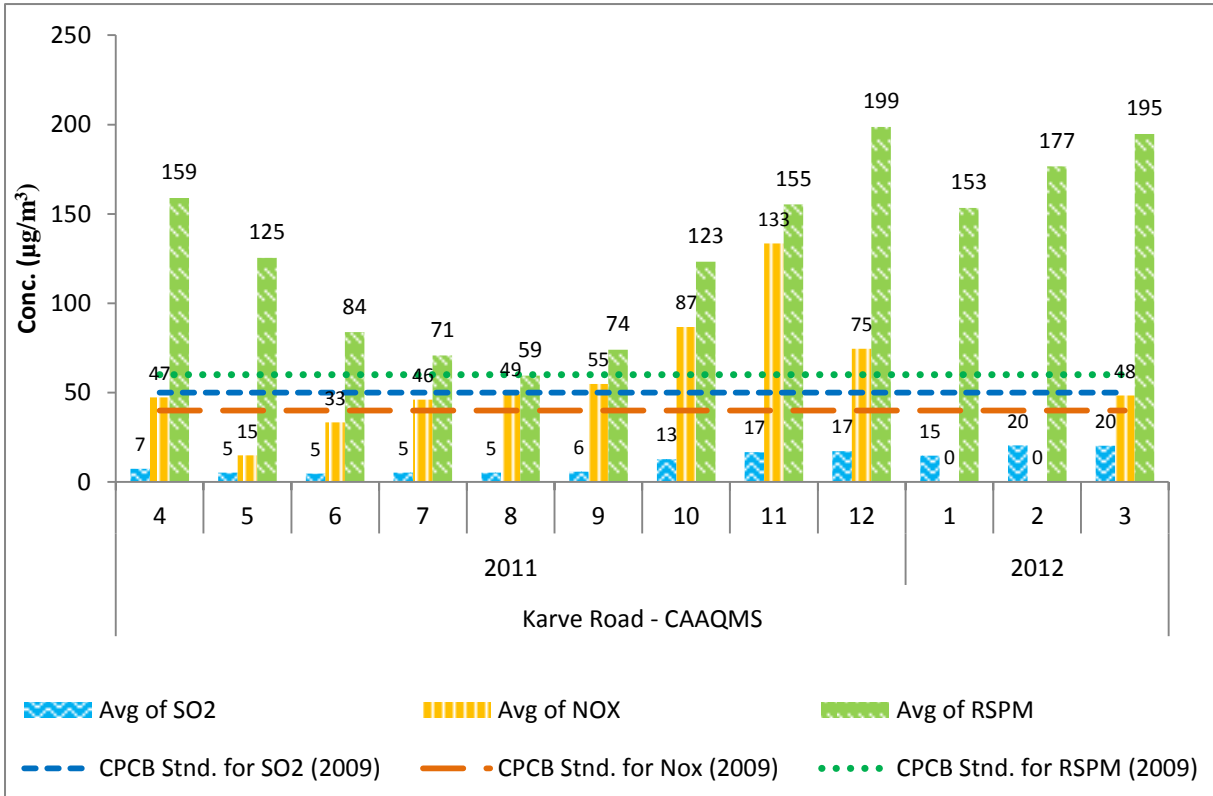


Figure No 135: Monthly average reading recorded at Karve Road- CAAQMS– Pune

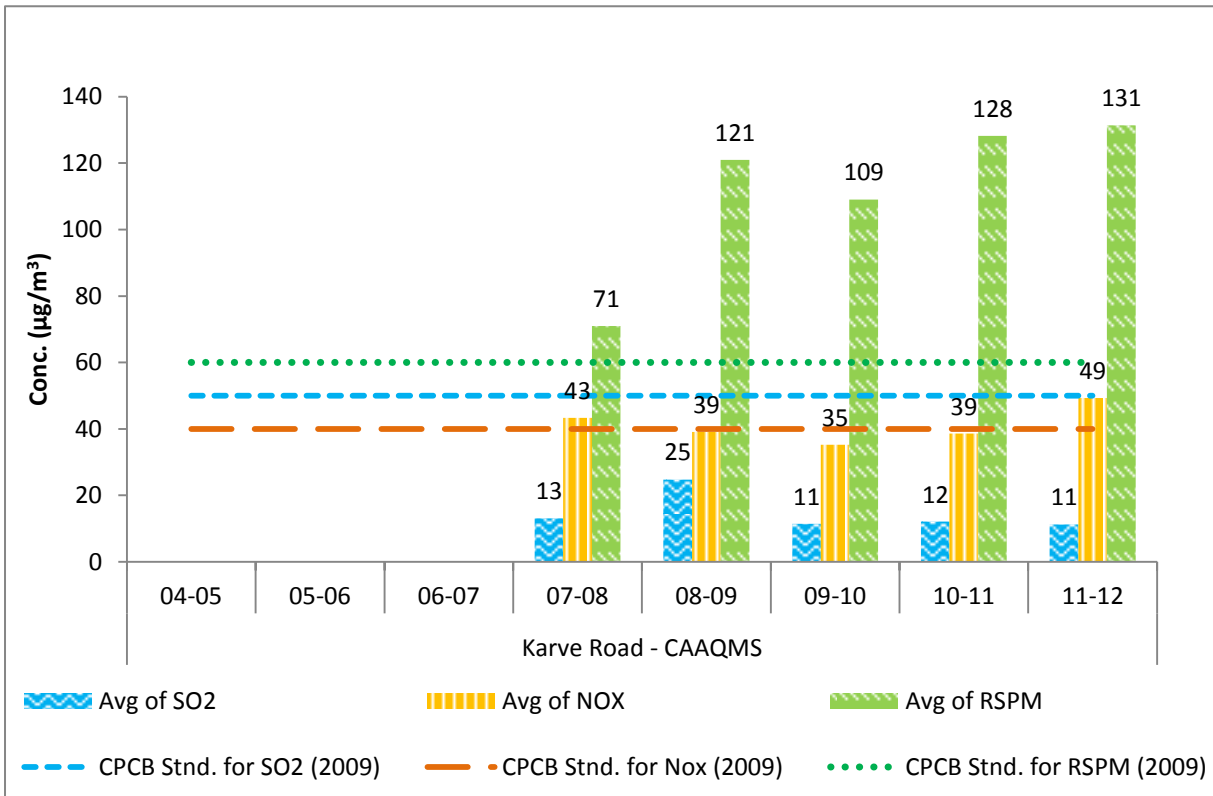


Figure No 136: Annual average trend of SO₂, NO_x and RSPM at Karve Road- CAAQMS– Pune

Pune – Bhosari

Table No 134: Data for monthly average reading recorded at Bhosari– Pune

FY	N	Monthly average ($\mu\text{g}/\text{m}^3$)		
		SO ₂	NO _x	RSPM
2011-12				
Apr	9	30	52	109
May	8	23	34	71
Jun	9	40	48	73
Jul	9	53	56	76
Aug	9	55	53	87
Sep	7	30	35	72
Oct	9	23	33	104
Nov	9	45	53	171
Dec	9	46	64	257
Jan	8	40	59	213
Feb	9	35	53	204
Mar	8	24	46	116
	Total N		% of exceedence	
	103	0.0	2.9	53.4

Table No 135: Data for annual average trend of SO₂, NO_x and RSPM at Bhosari– Pune

Year	N	Annual average ($\mu\text{g}/\text{m}^3$)		
		SO ₂	NO _x	RSPM
<i>Annual Standards</i>		50	40	60
04-05	-	-	-	-
05-06	40	27	42	144
06-07	99	24	42	126
07-08	100	20	42	111
08-09	106	24	37	109
09-10	103	42	36	88
10-11	97	30	38	84
11-12	103	37	49	130

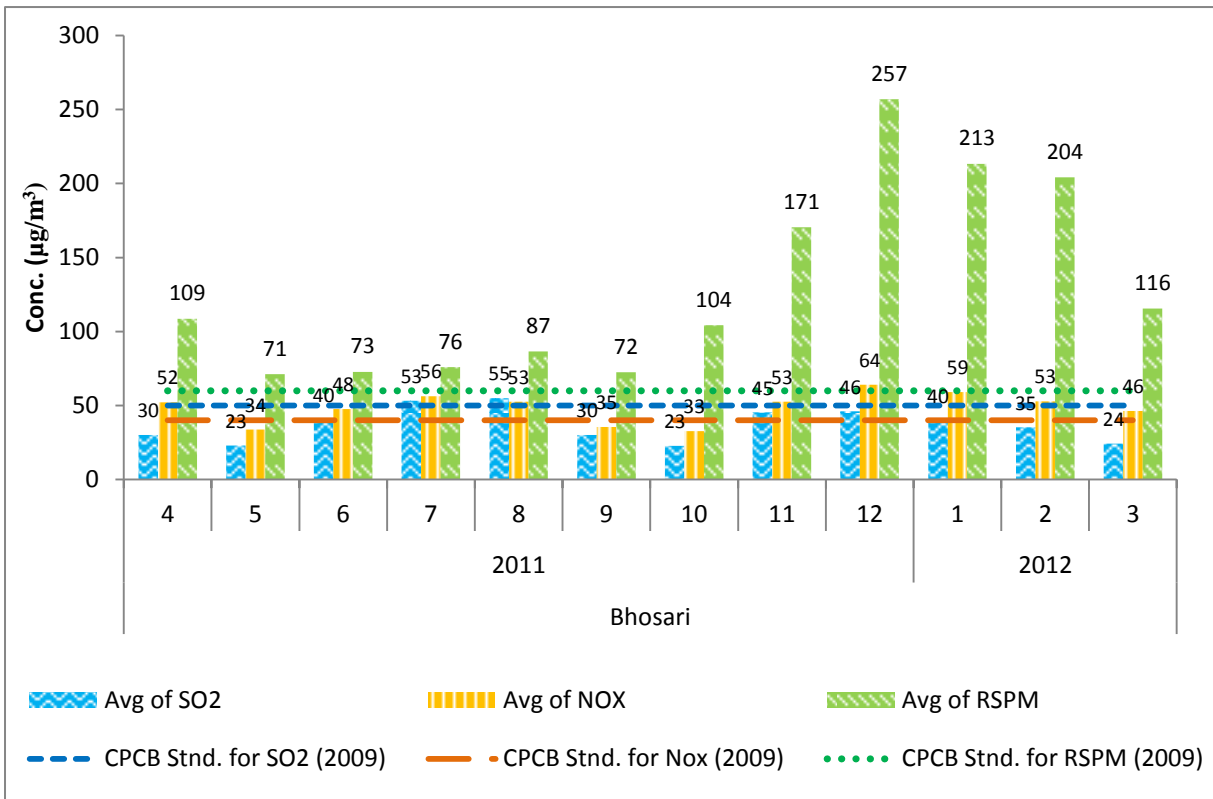


Figure No 137: Monthly average reading recorded at Bhosari– Pune

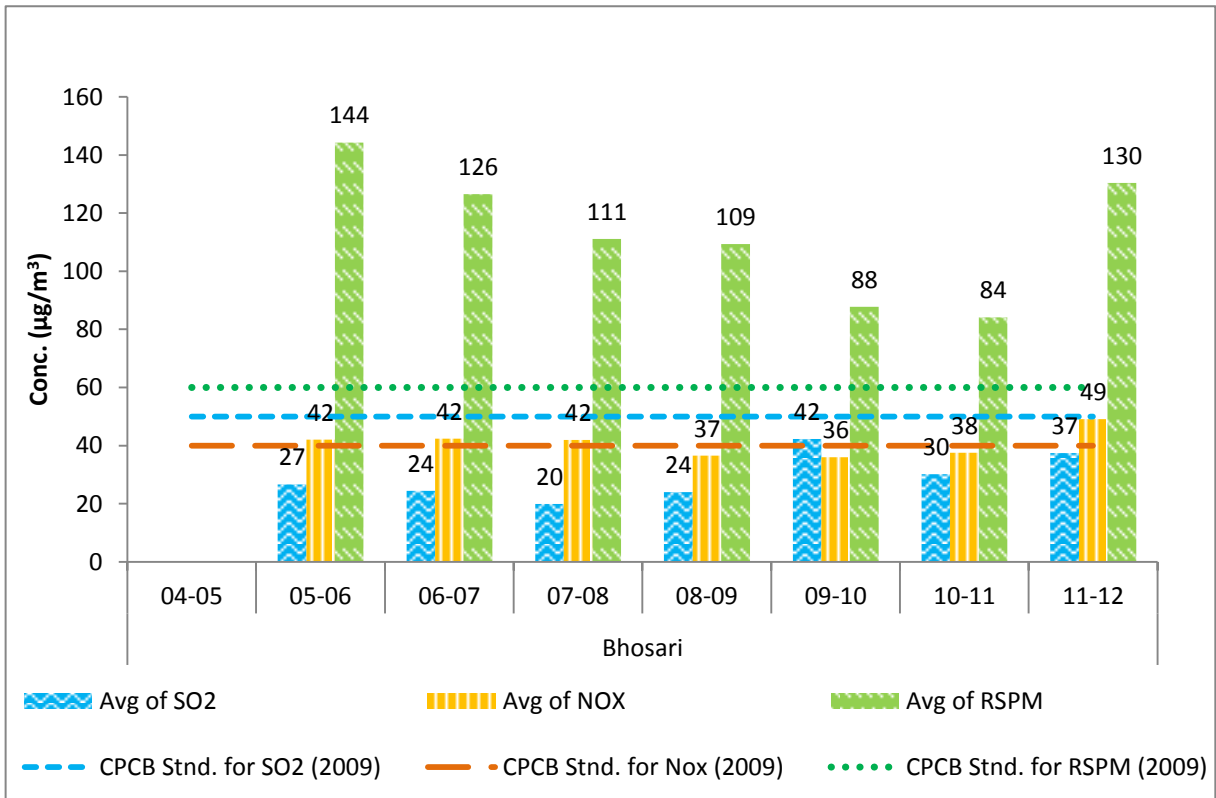


Figure No 138: Annual average trend of SO₂, NO_x and RSPM at Bhosari– Pune

Pune - Nal Stop

Table No 136: Data for monthly average reading recorded at Nal Stop– Pune

FY	N	Monthly average ($\mu\text{g}/\text{m}^3$)		
		SO ₂	NO _x	RSPM
2011-12				
Apr	9	21	54	88
May	9	24	44	58
Jun	8	38	72	53
Jul	9	50	67	50
Aug	9	50	63	43
Sep	9	34	54	48
Oct	9	18	49	113
Nov	8	21	73	131
Dec	9	29	84	148
Jan	9	22	64	128
Feb	8	23	64	168
Mar	8	35	52	192
	Total N		% of exceedence	
	104	0.0	13.5	44.2

Table No 137: Data for annual average trend of SO₂, NO_x and RSPM at Nal Stop– Pune

Year	N	Annual average ($\mu\text{g}/\text{m}^3$)		
		SO ₂	NO _x	RSPM
<i>Annual Standards</i>		50	40	60
04-05	-	-	-	-
05-06	44	27	43	152
06-07	93	23	42	129
07-08	101	19	42	108
08-09	107	21	41	91
09-10	102	23	39	82
10-11	102	21	43	88
11-12	104	30	62	100

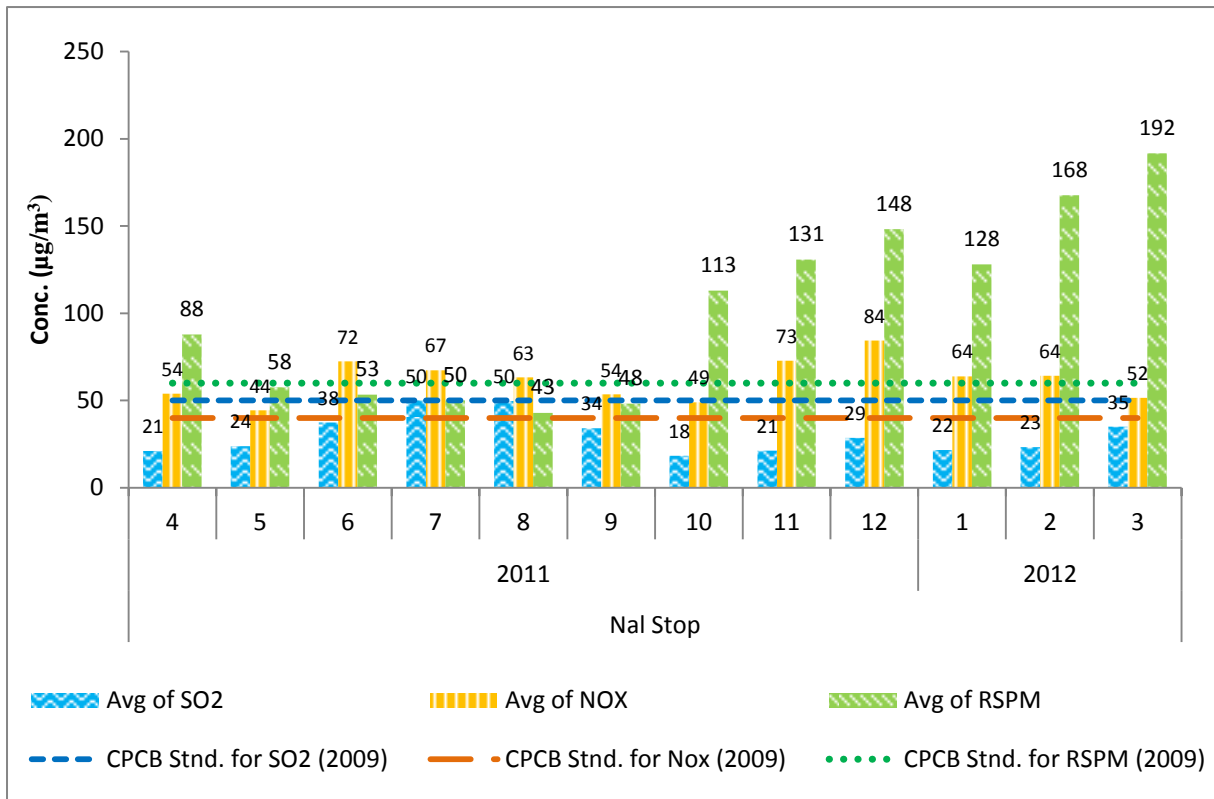


Figure No 139: Monthly average reading recorded at Nal Stop– Pune

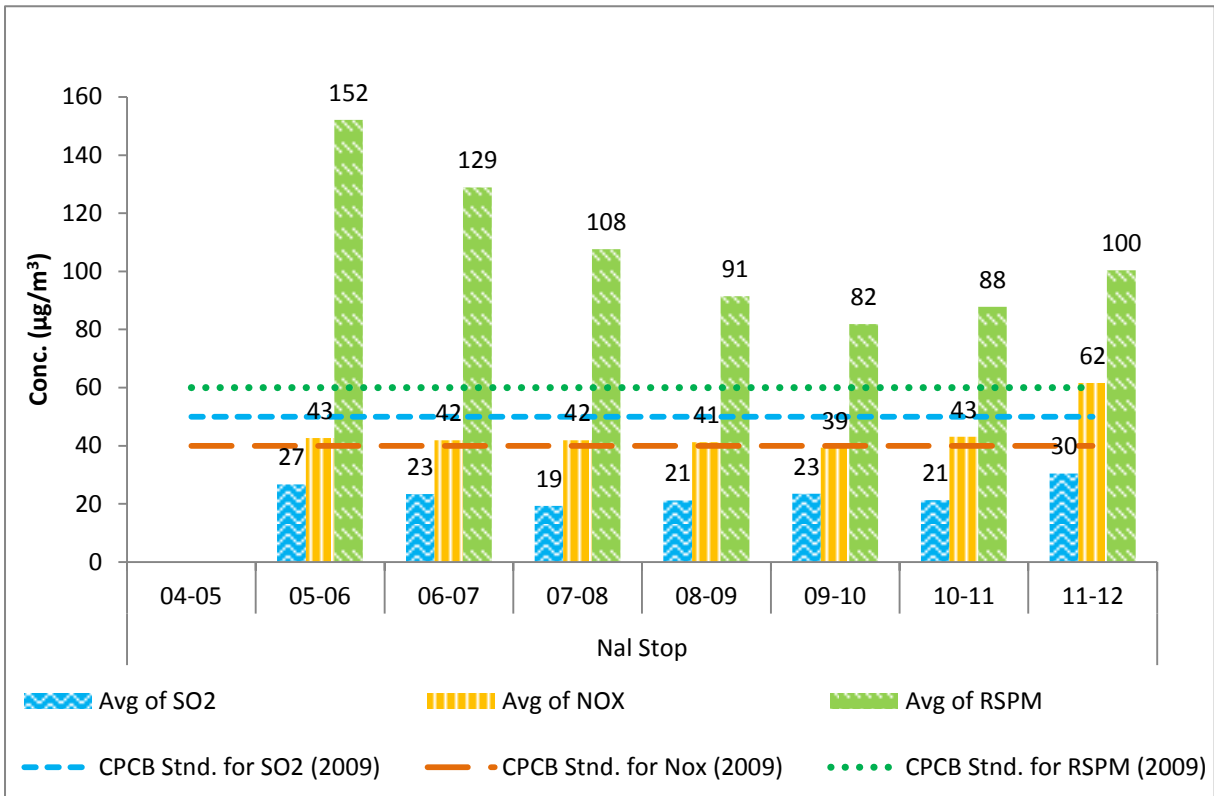


Figure No 140: Annual average trend of SO₂, NO_x and RSPM at Nal Stop– Pune

Pune - Swargate

Table No 138: Data for monthly average reading recorded at Swargate– Pune

FY	N	Monthly average ($\mu\text{g}/\text{m}^3$)		
		SO ₂	NO _x	RSPM
2011-12				
Apr	7	23	62	72
May	9	21	51	55
Jun	-	-	-	-
Jul	8	51	55	42
Aug	8	56	55	27
Sep	8	38	40	34
Oct	9	19	52	100
Nov	8	23	89	142
Dec	9	19	98	149
Jan	8	23	76	146
Feb	8	18	62	136
Mar	9	21	57	129
	Total N		% of exceedence	
	91	0.0	20.9	46.2

Table No 139: Data for annual average trend of SO₂, NO_x and RSPM at Swargate – Pune

Year	N	Annual average ($\mu\text{g}/\text{m}^3$)		
		SO ₂	NO _x	RSPM
<i>Annual Standards</i>		50	40	60
04-05	-	-	-	-
05-06	44	27	43	152
06-07	95	25	43	138
07-08	97	20	46	101
08-09	112	23	44	100
09-10	107	24	39	81
10-11	105	23	50	80
11-12	91	28	63	95

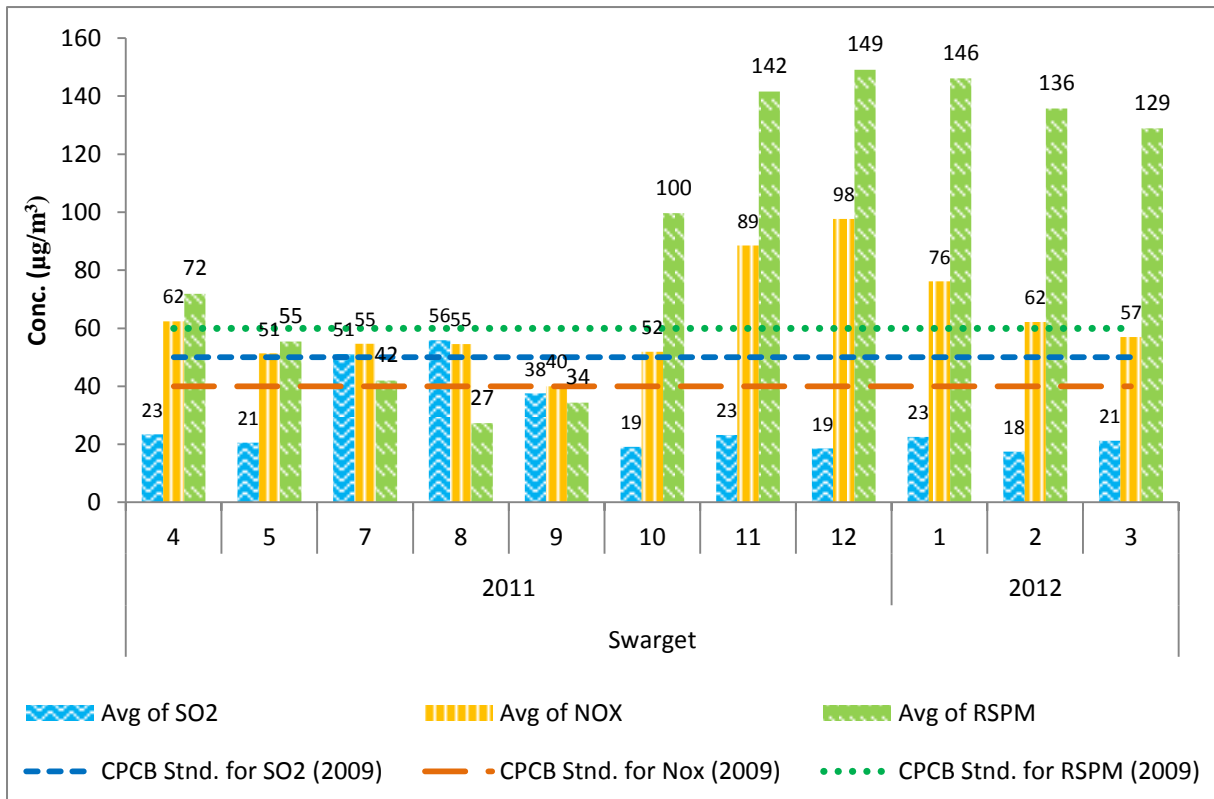


Figure No 141: Monthly average reading recorded at Swargate– Pune

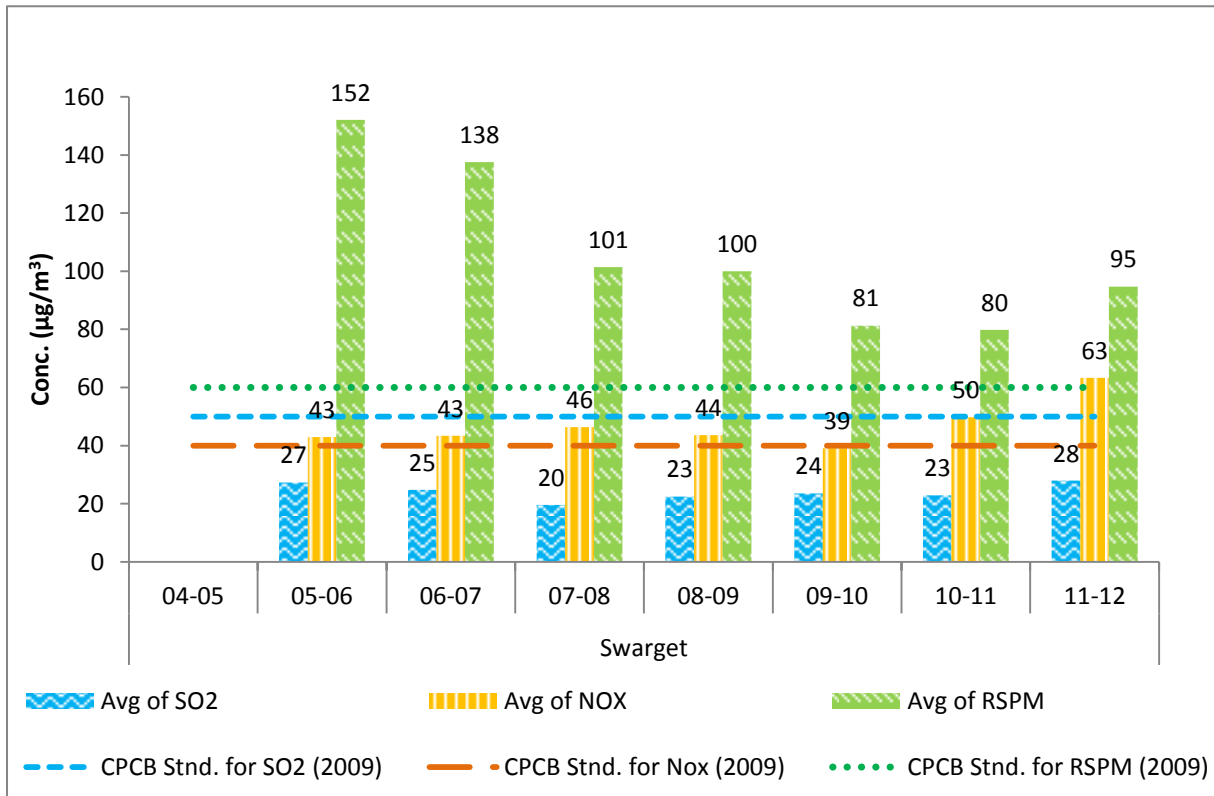


Figure No 142: Annual average trend of SO₂, NO_x and RSPM at Swargate – Pune

Pune - Pimpri-Chinchwad - BOB Building

Table No 140: Data for monthly average reading recorded at Pimpri-Chinchwad - BOB Building– Pune

FY	N	Monthly average ($\mu\text{g}/\text{m}^3$)		
		SO ₂	NO _x	RSPM
2011-12				
Apr	25	29	70	79
May	23	22	50	55
Jun	-	-	-	-
Jul	26	49	63	58
Aug	24	51	60	43
Sep	25	34	41	62
Oct	26	20	39	114
Nov	24	31	57	175
Dec	23	37	66	209
Jan	25	29	62	181
Feb	25	27	63	168
Mar	24	31	63	151
	Total N		% of exceedance	
	270	0.0	10.0	54.1

Table No 141: Data for annual average trend of SO₂, NO_x and RSPM at Pimpri-Chinchwad - BOB Building– Pune

Year	N	Annual average ($\mu\text{g}/\text{m}^3$)		
		SO ₂	NO _x	RSPM
<i>Annual Standards</i>		50	40	60
04-05	-	-	-	-
05-06	173	21	35	114
06-07	277	24	42	127
07-08	291	19	41	105
08-09	283	23	39	96
09-10	265	31	43	89
10-11	300	26	49	86
11-12	270	33	57	117

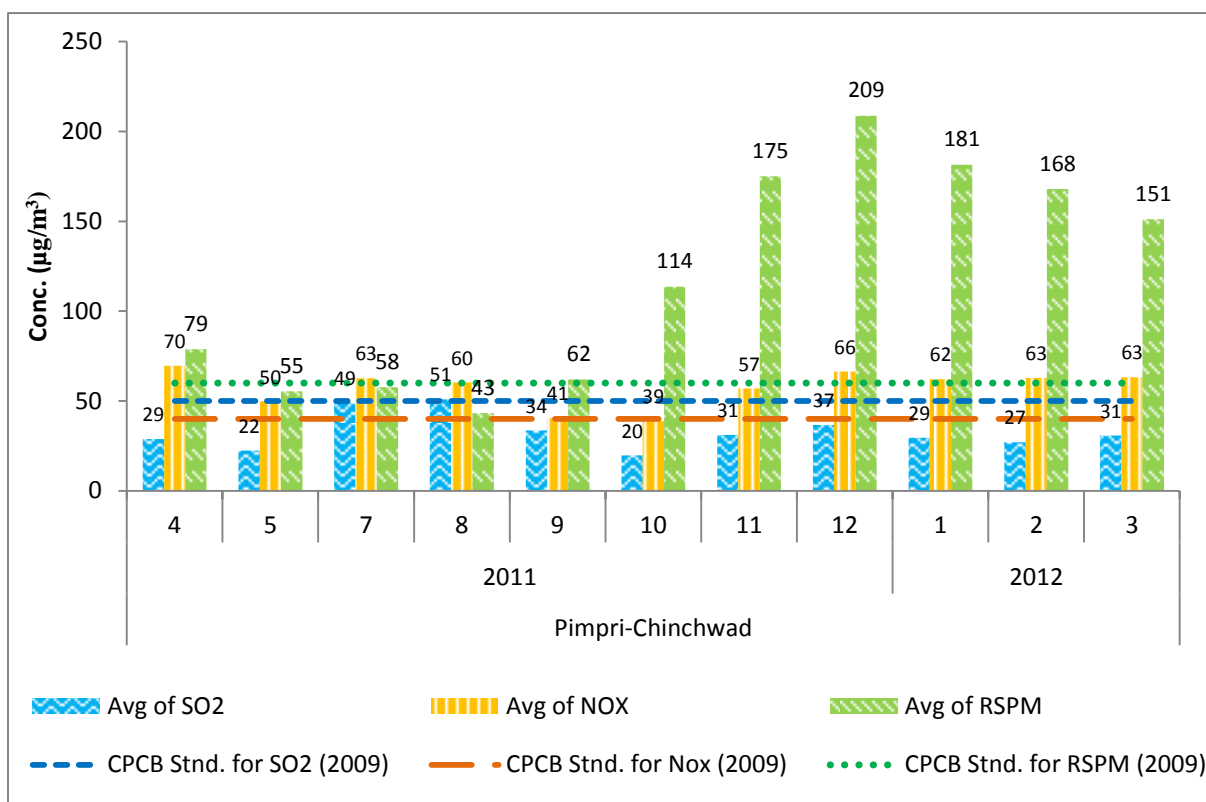


Figure No 143: Monthly average reading recorded at Pimpri-Chinchwad - BOB Building- Pune

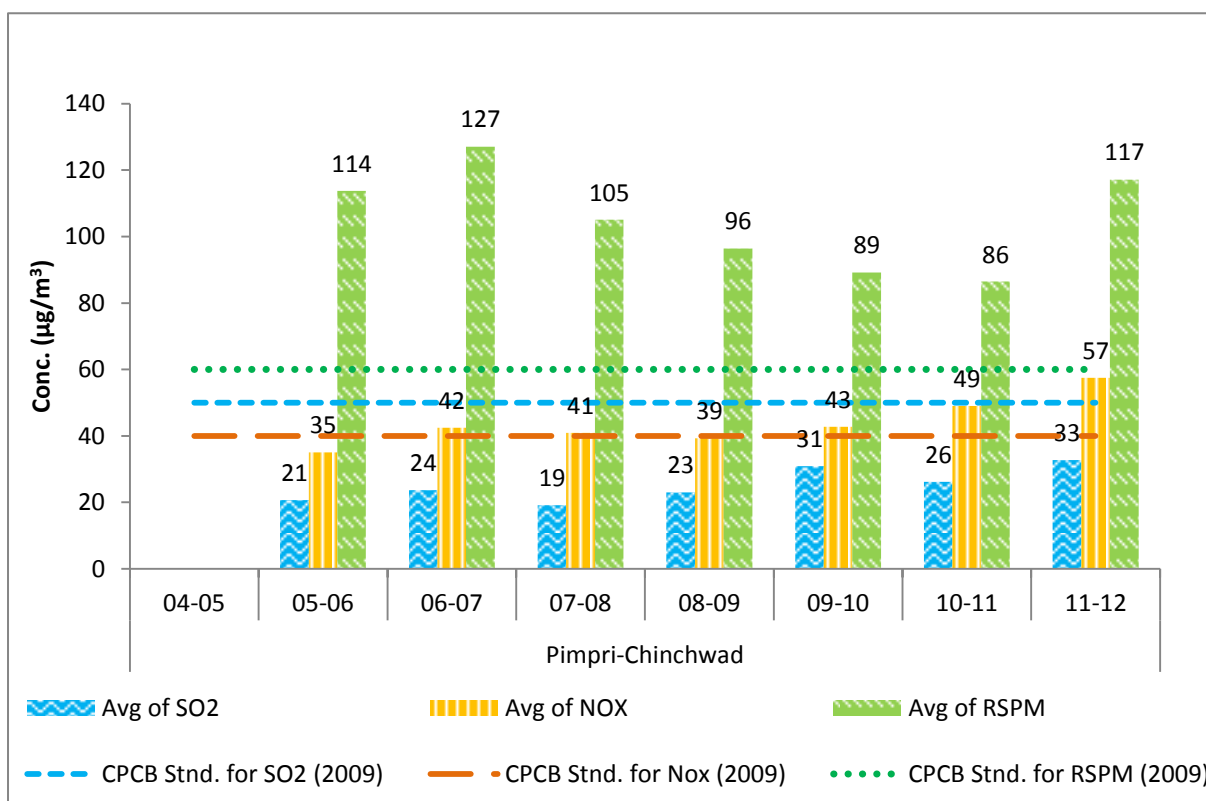


Figure No 144: Annual average trend of SO₂, NO_x and RSPM at Pimpri-Chinchwad - BOB Building- Pune

Solapur - Solapur

Table No 142: Data for monthly average reading recorded at Solapur

FY	N	Monthly average ($\mu\text{g}/\text{m}^3$)		
		SO ₂	NO _x	RSPM
2011-12				
Apr	29	12	38	121
May	29	12	34	113
Jun	30	13	32	74
Jul	31	12	32	61
Aug	31	12	34	64
Sep	29	14	34	82
Oct	31	13	40	122
Nov	30	12	45	129
Dec	31	11	48	152
Jan	28	12	48	154
Feb	29	11	48	152
Mar	31	11	50	169
	Total N		% of exceedence	
	359	0.0	0.0	62.1

Table No 143: Data for annual average trend of SO₂, NO_x and RSPM at Solapur

Year	N	Annual average ($\mu\text{g}/\text{m}^3$)		
		SO ₂	NO _x	RSPM
<i>Annual Standards</i>		50	40	60
04-05	-	-	-	-
05-06	-	-	-	-
06-07	-	-	-	-
07-08	195	15	31	102
08-09	231	15	30	96
09-10	-	-	-	-
10-11	250	13	37	112
11-12	359	12	40	116

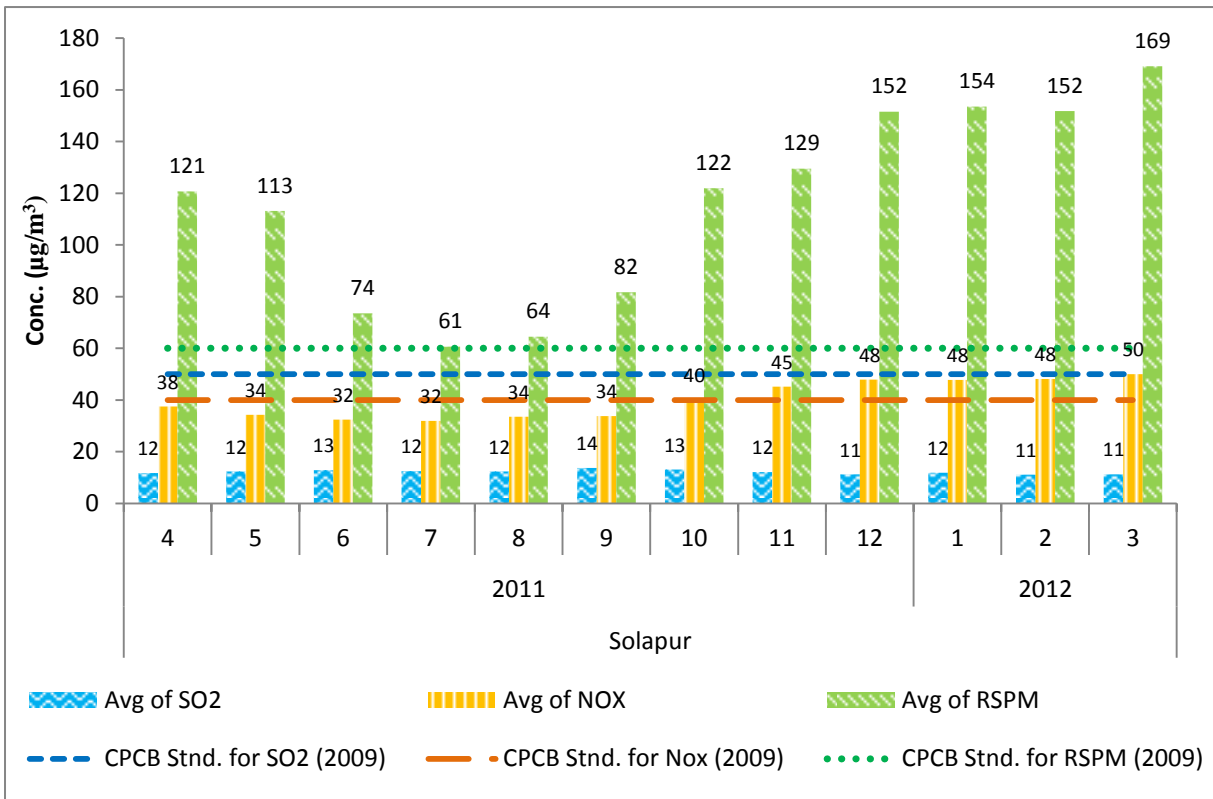


Figure No 145: Monthly average reading recorded at Solapur

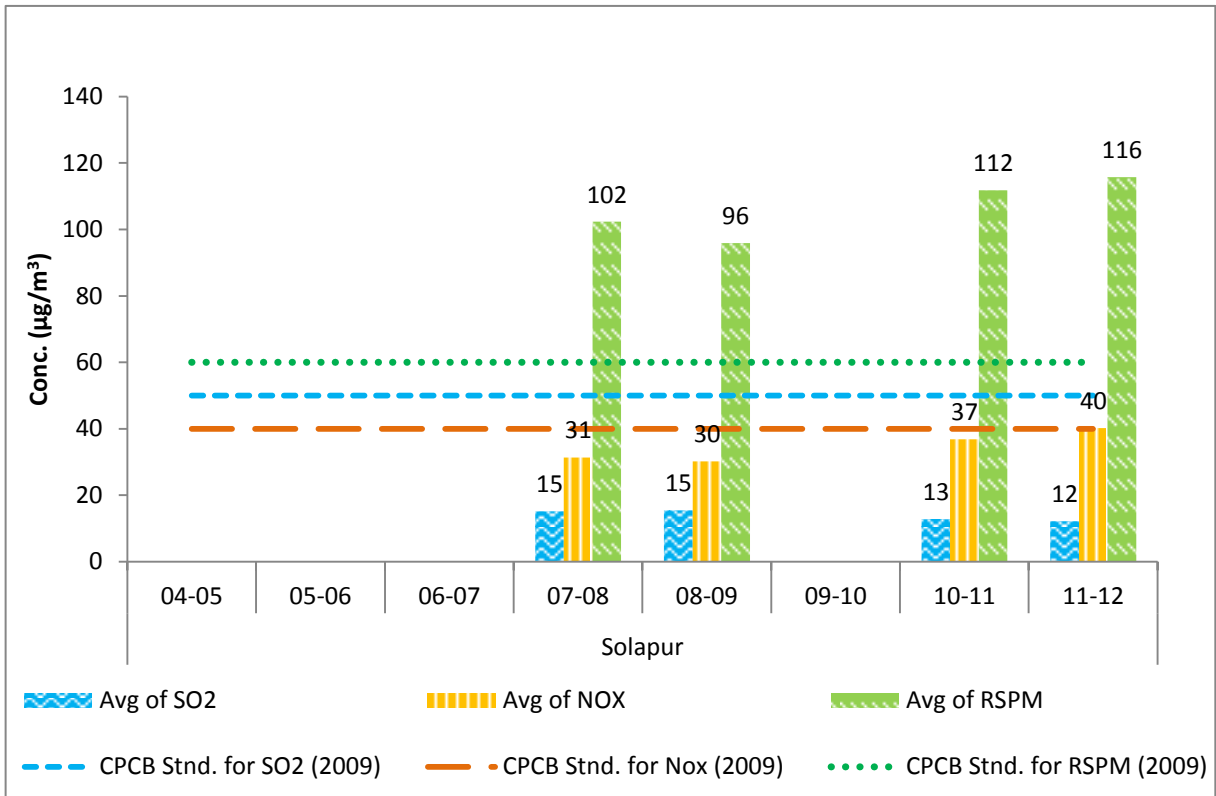


Figure No 146: Annual average trend of SO₂, NO_x and RSPM at Solapur

Solapur - Saat Rasta- Chithale Clinic

Table No 144: Data for monthly average reading recorded at Saat Rasta- Chithale Clinic – Solapur

FY	N	Monthly average ($\mu\text{g}/\text{m}^3$)		
		SO ₂	NO _x	RSPM
2011-12				
Apr	1	17	#DIV/0!	78
May	8	16	33	84
Jun	8	17	35	86
Jul	9	16	34	73
Aug	8	17	36	59
Sep	9	16	35	66
Oct	9	17	35	62
Nov	9	17	35	66
Dec	9	17	35	69
Jan	9	17	37	92
Feb	8	18	37	98
Mar	9	17	35	95
	Total N		% of exceedence	
	96	0.0	0.0	14.6

Table No 145: Data for annual average trend of SO₂, NO_x and RSPM at Saat Rasta- Chithale Clinic – Solapur

Year	N	Annual average ($\mu\text{g}/\text{m}^3$)		
		SO ₂	NO _x	RSPM
<i>Annual Standards</i>		50	40	60
04-05	104	18	40	144
05-06	95	18	38	125
06-07	104	17	36	107
07-08	100	18	34	96
08-09	105	18	36	74
09-10	103	17	36	66
10-11	108	17	34	69
11-12	96	17	35	77

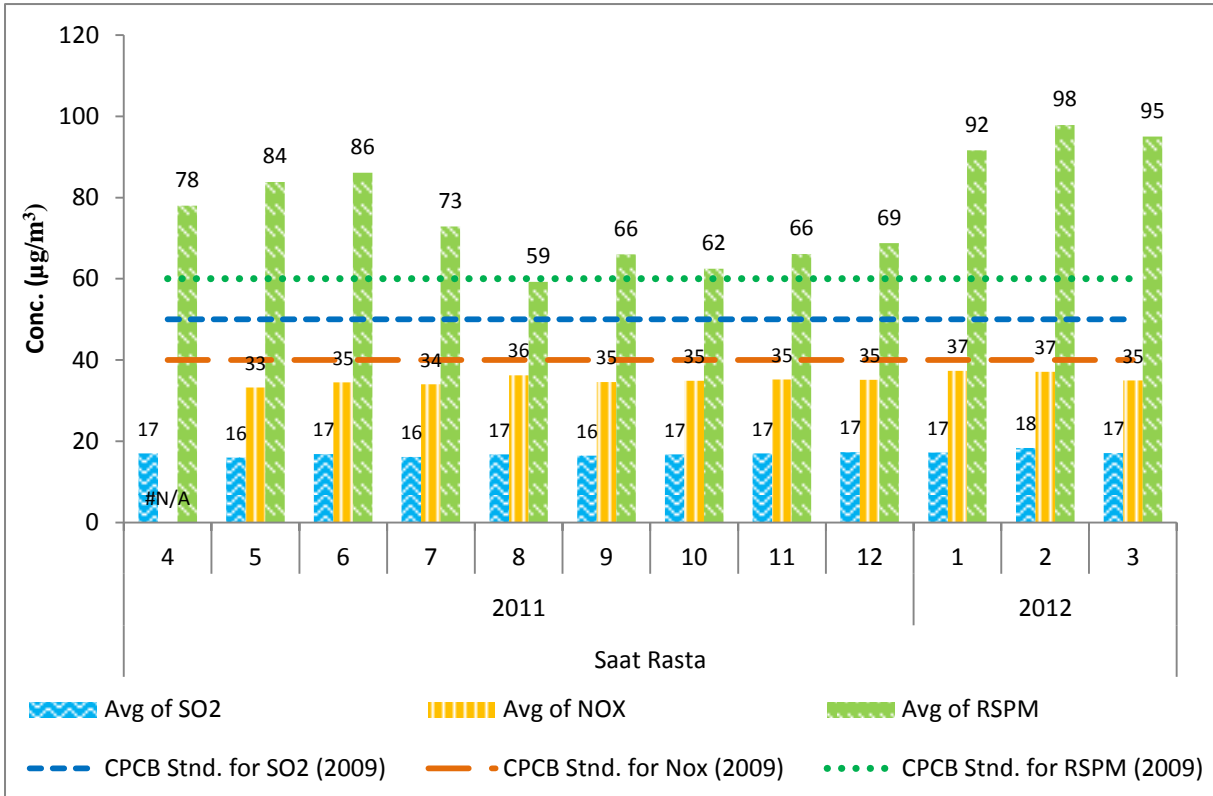


Figure No 147: Monthly average reading recorded at Saat Rasta- Chithale Clinic – Solapur

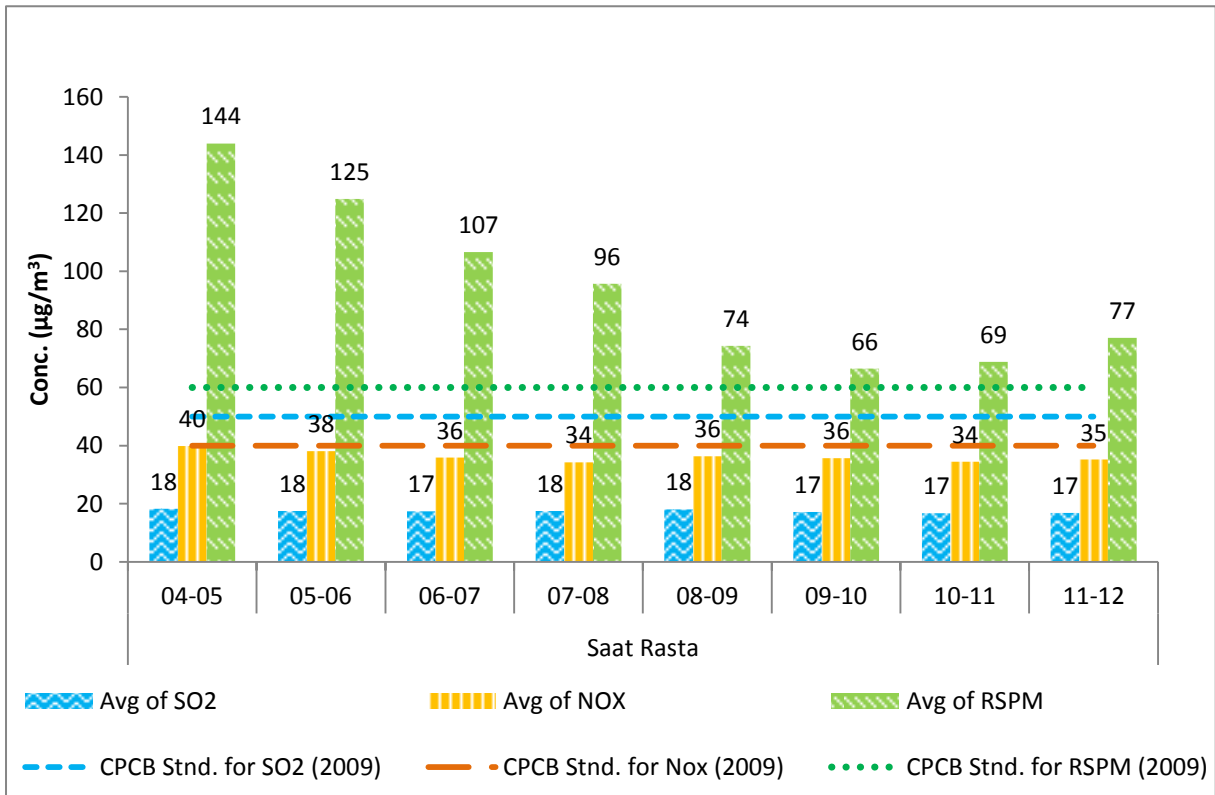


Figure No 148: Annual average trend of SO₂, NO_x and RSPM at Saat Rasta- Chithale Clinic – Solapur

Solapur – WIT campus

Table No 146: Data for monthly average reading recorded at WIT Campus – Solapur

FY	N	Monthly average ($\mu\text{g}/\text{m}^3$)		
		SO ₂	NO _x	RSPM
2011-12				
Apr	8	16	34	71
May	9	16	34	85
Jun	9	17	35	78
Jul	8	16	34	79
Aug	9	17	37	63
Sep	9	17	35	54
Oct	8	17	35	68
Nov	8	17	35	65
Dec	9	17	36	73
Jan	9	17	36	77
Feb	8	18	37	116
Mar	9	17	35	100
	Total N		% of exceedence	
	103	0.0	0.0	12.6

Table No 147: Data for annual average trend of SO₂, NO_x and RSPM at WIT Campus – Solapur

Year	N	Annual average ($\mu\text{g}/\text{m}^3$)		
		SO ₂	NO _x	RSPM
<i>AnnualStandards</i>		50	40	60
04-05	106	18	40	137
05-06	95	17	37	115
06-07	104	16	35	97
07-08	106	17	34	86
08-09	103	17	35	76
09-10	103	17	35	71
10-11	107	17	35	74
11-12	103	17	35	77

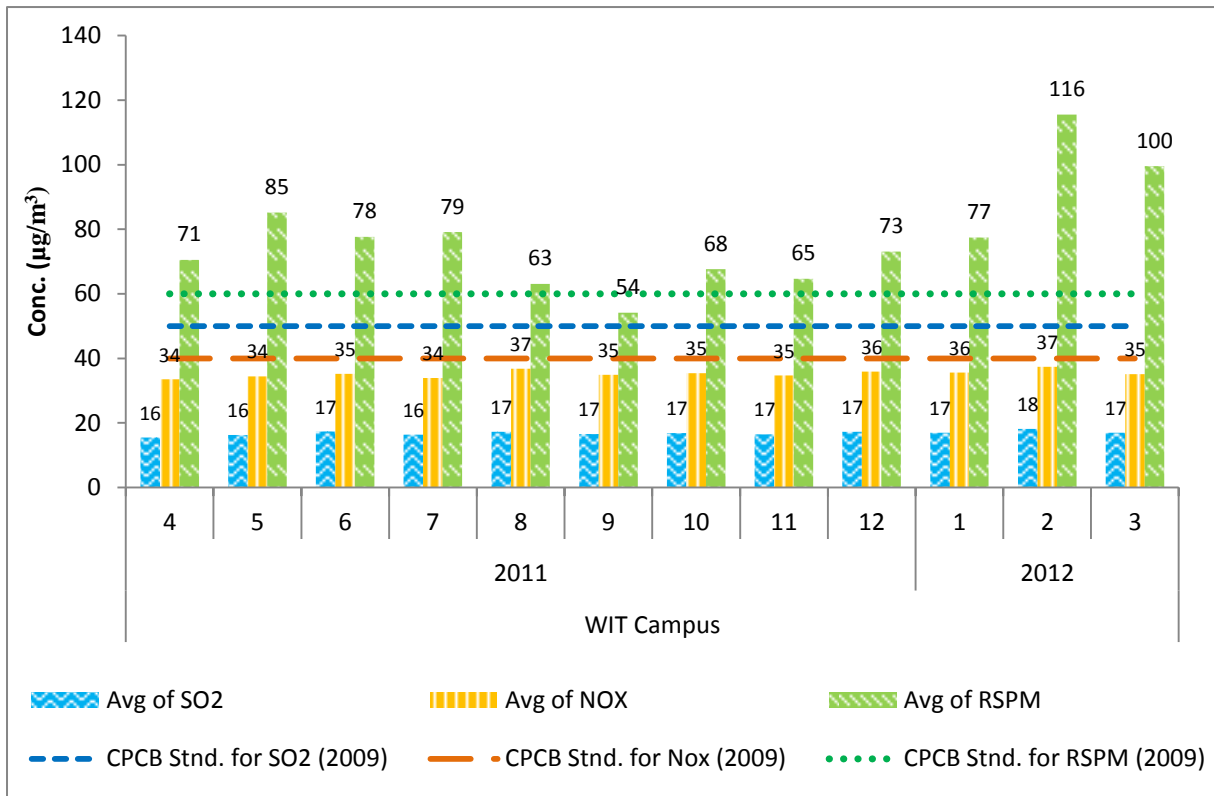


Figure No 149: Monthly average reading recorded at WIT Campus – Solapur

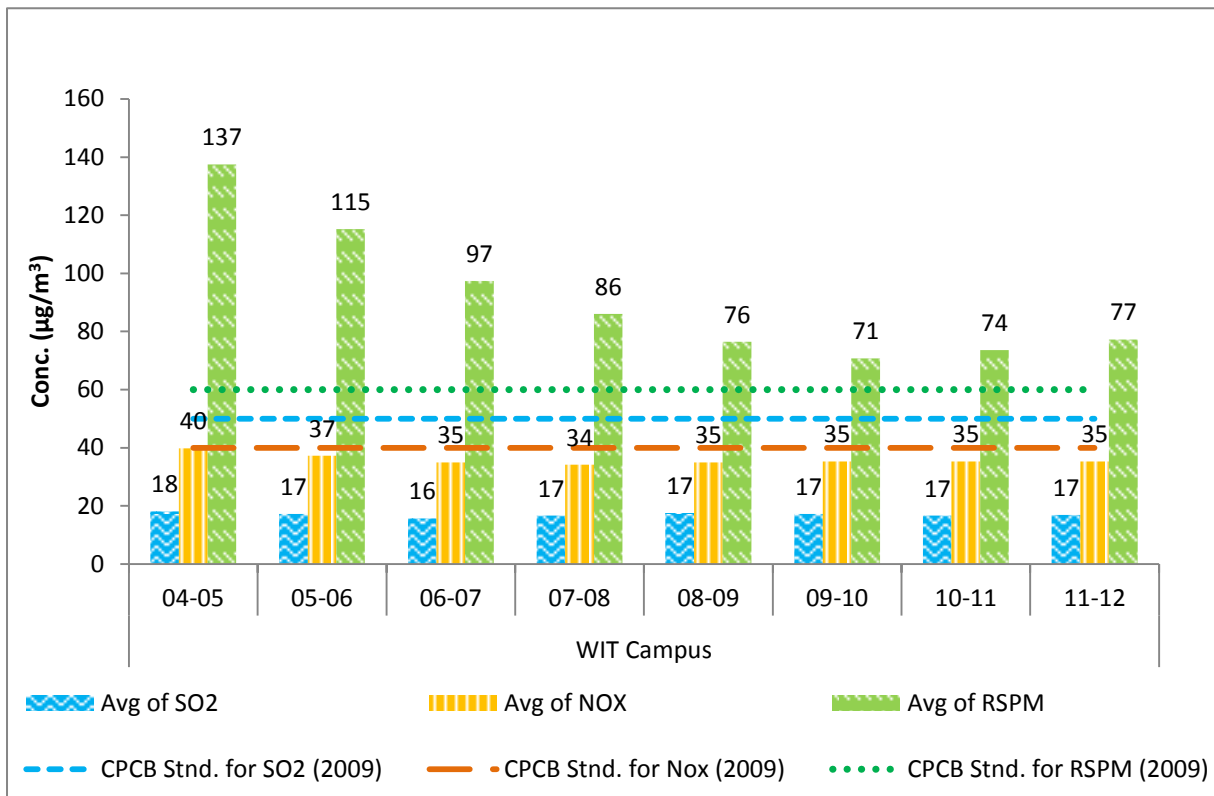
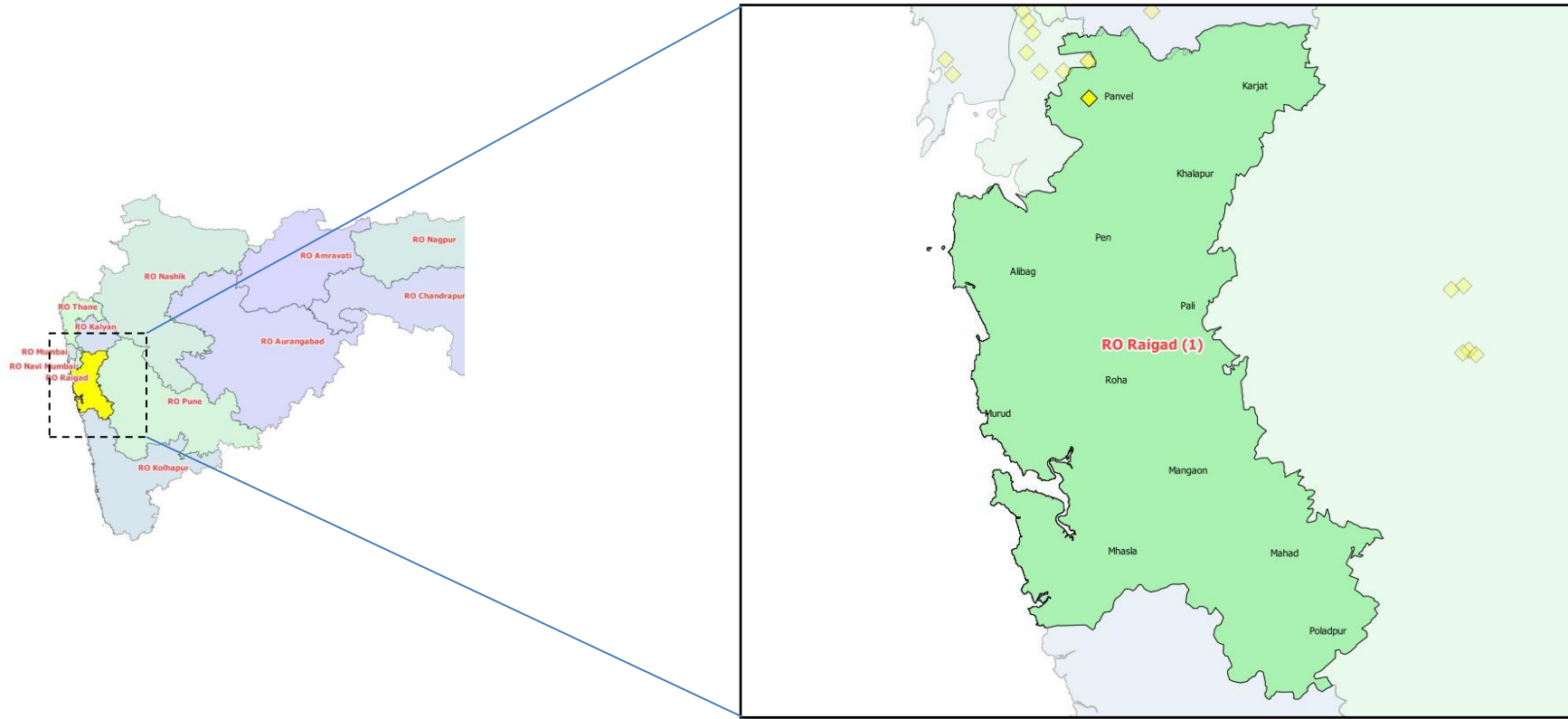


Figure No 150: Annual average trend of SO₂, NO_x and RSPM at WIT Campus – Solapur

RO – Raigad



Region	Program name	SN	Station	Frequency	Latitude	Longitude
Panvel	NAMP	495	Panvel Water Supply Plant	Two Days In A Week	18° 59.396'	73° 07.059'

Panvel - Panvel Water Supply Plant

Table No 148: Data for Monthly average reading recorded at Panvel Water Supply Plant – Panvel

FY	N	Monthly average ($\mu\text{g}/\text{m}^3$)		
		SO ₂	NO _x	RSPM
2011-12				
Apr	9	18	46	224
May	8	18	52	133
Jun	9	14	44	53
Jul	9	10	34	60
Aug	9	11	33	38
Sep	-	-	-	-
Oct	9	17	42	112
Nov	9	16	39	154
Dec	9	17	45	180
Jan	8	16	46	171
Feb	9	14	40	159
Mar	9	16	43	255

Table No 149: Data for Annual average trend of SO₂, NO_x and RSPM at Panvel Water Supply Plant – Panvel

Year	N	Annual average ($\mu\text{g}/\text{m}^3$)		
		SO ₂	NO _x	RSPM
<i>Annual Standards</i>		50	40	60
04-05	-	-	-	-
05-06	-	-	-	-
06-07	71	14	35	115
07-08	119	12	37	143
08-09	106	14	40	132
09-10	102	12	42	71
10-11	100	15	35	119
11-12	97	15	42	140

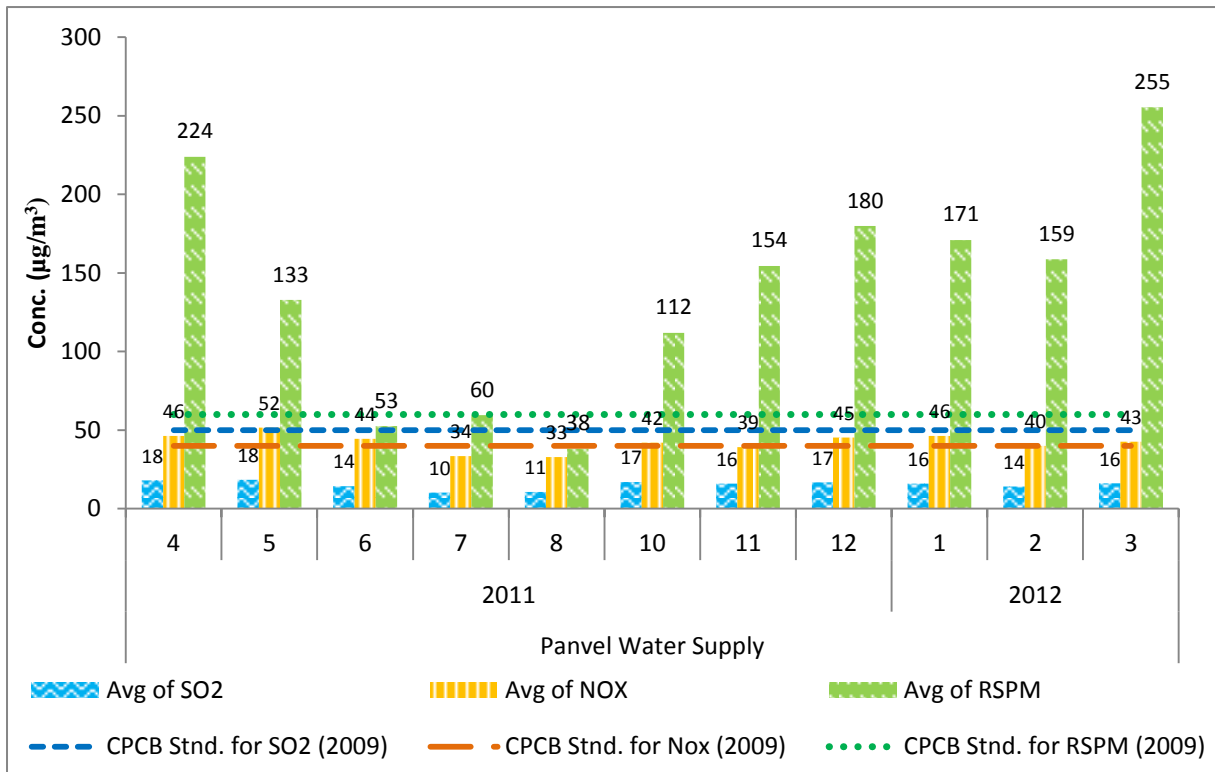


Figure No 151: Monthly average reading recorded at Panvel Water Supply Plant – Panvel

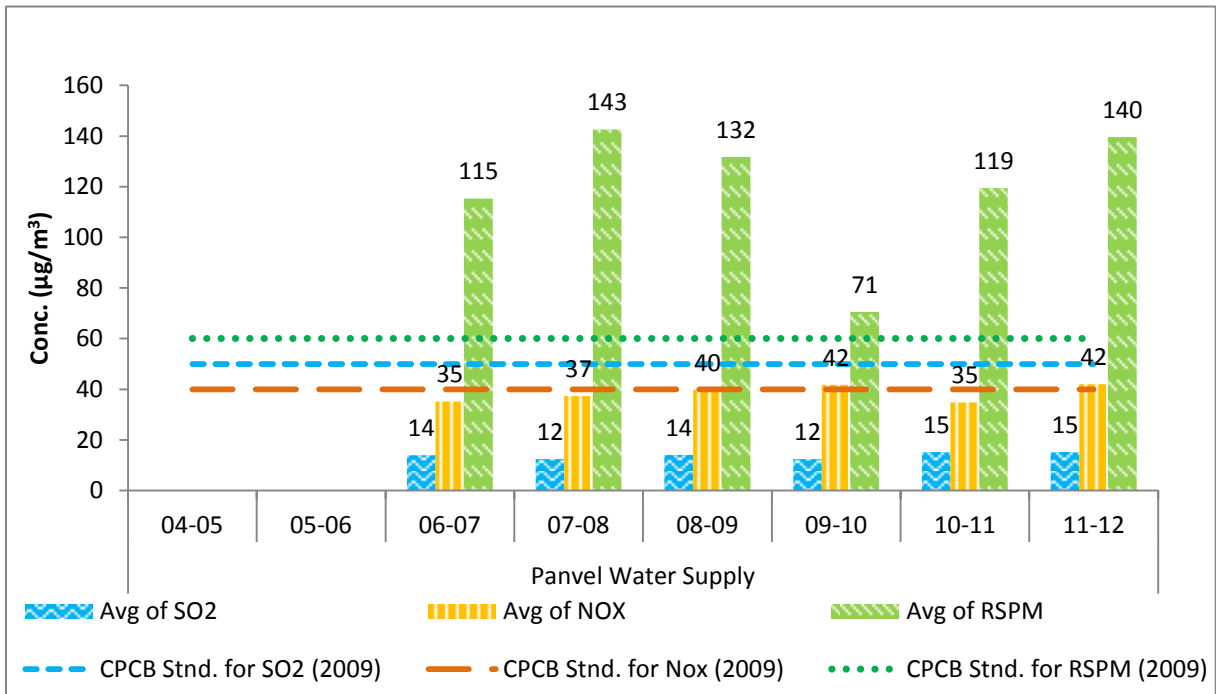
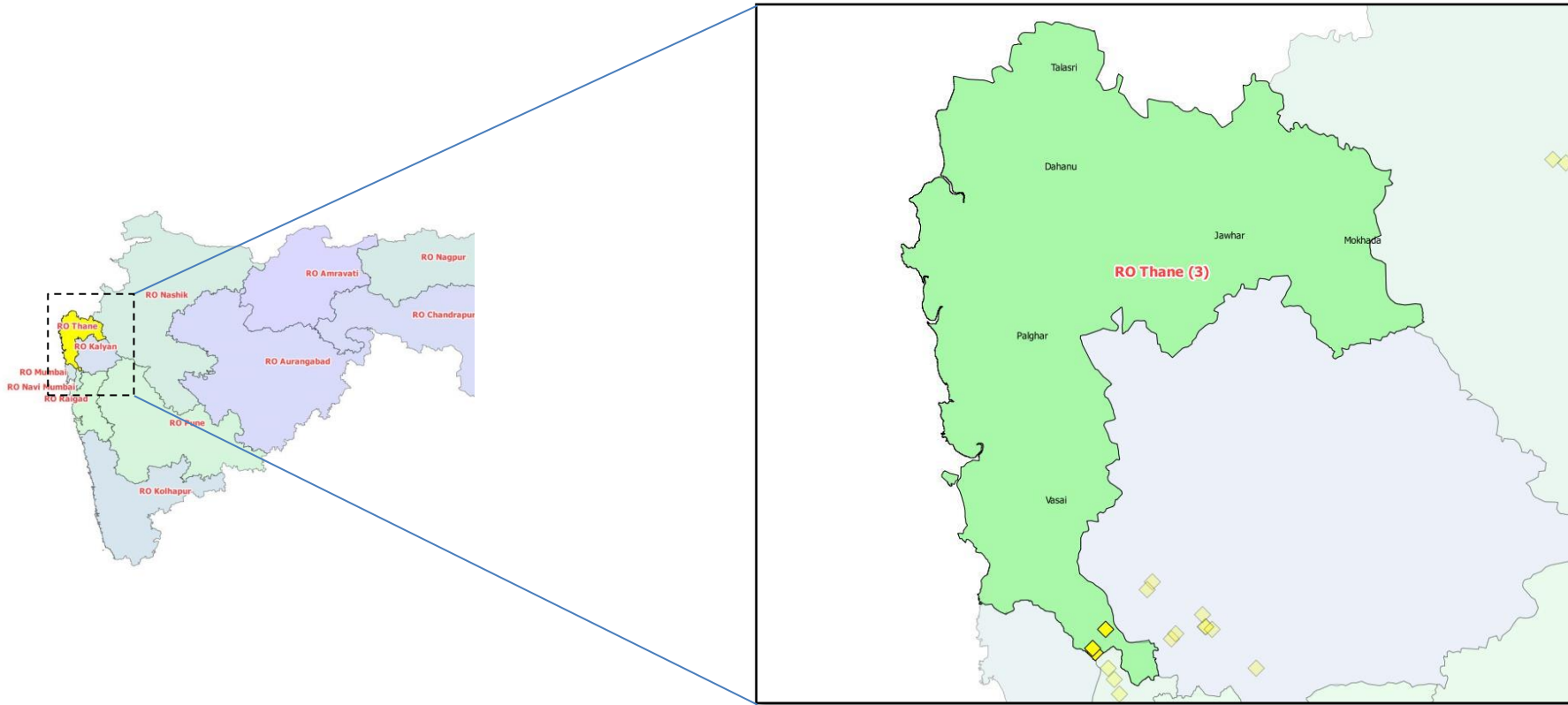


Figure No 152: Annual average trend of SO₂, NO_x and RSPM at Panvel Water Supply Plant – Panvel

RO – Thane



Region	Program	SN	Station	Frequency	Latitude	Longitude
Thane	NAMP	305	Kolshet	One day in a Week	19° 13.206'	72° 59.323'
		303	Kopri	Two Days In A Week	19° 10.922'	72° 58.285'
		304	Naupada	Two Days In A Week	19° 11.290'	72° 58.068'

Thane – Kolshet

Table No 150: Data for monthly average reading recorded at Kolshet – Thane

FY	N	Monthly average ($\mu\text{g}/\text{m}^3$)		
		SO ₂	NO _x	RSPM
2011-12				
Apr	-	-	-	-
May	-	-	-	-
Jun	-	-	-	-
Jul	3	5	9	17
Aug	4	17	14	57
Sep	4	19	15	56
Oct	2	20	13	58
Nov	6	22	14	59
Dec	8	19	12	67
Jan	8	23	13	61
Feb	9	21	13	59
Mar	1	21	14	58
	Total N		% of exceedence	
	45	0.0	0.0	0.0

Table No 151: Data for annual average trend of SO₂, NO_x and RSPM at Kolshet – Thane

Year	N	Annual average ($\mu\text{g}/\text{m}^3$)		
		SO ₂	NO _x	RSPM
<i>Annual Standards</i>		50	40	60
04-05	62	9	12	48
05-06	85	6	10	51
06-07	91	13	11	63
07-08	96	14	14	53
08-09	94	15	21	63
09-10	80	13	21	57
10-11	21	12	13	48
11-12	45	19	13	57

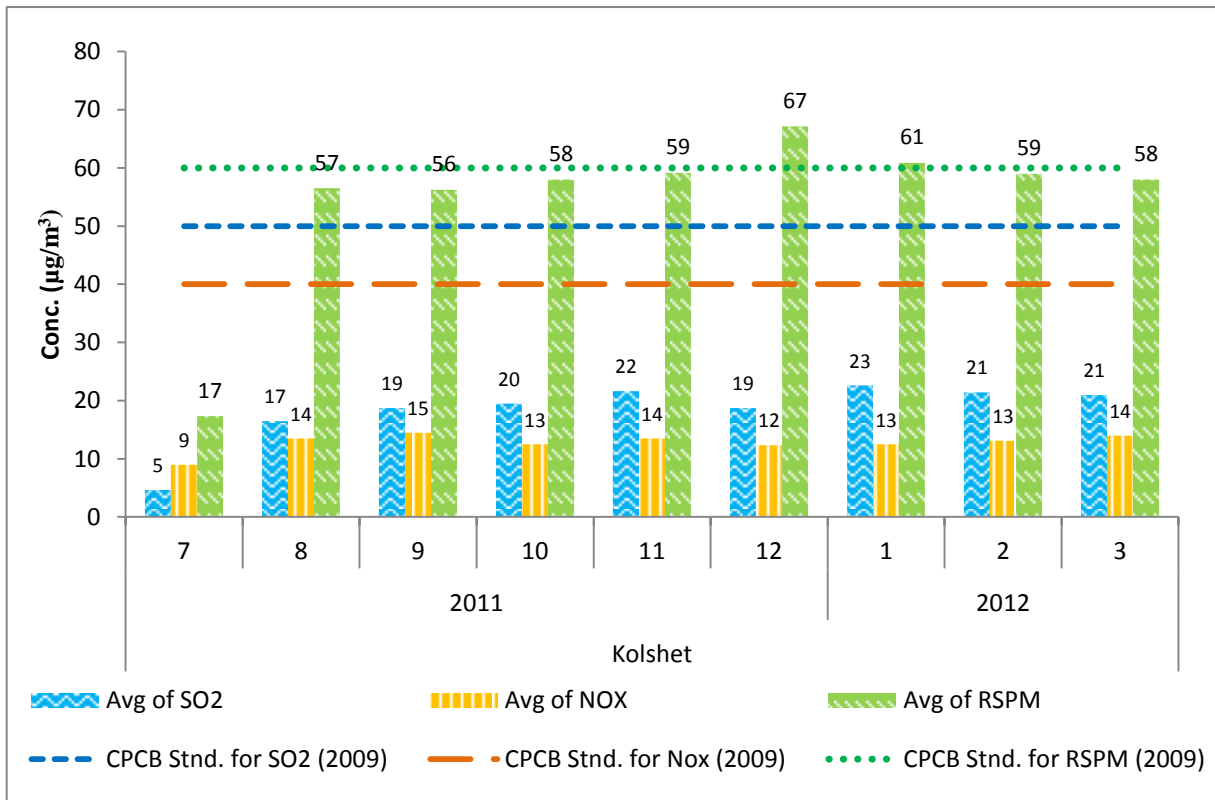


Figure No 153: Monthly average reading recorded at Kolshet – Thane

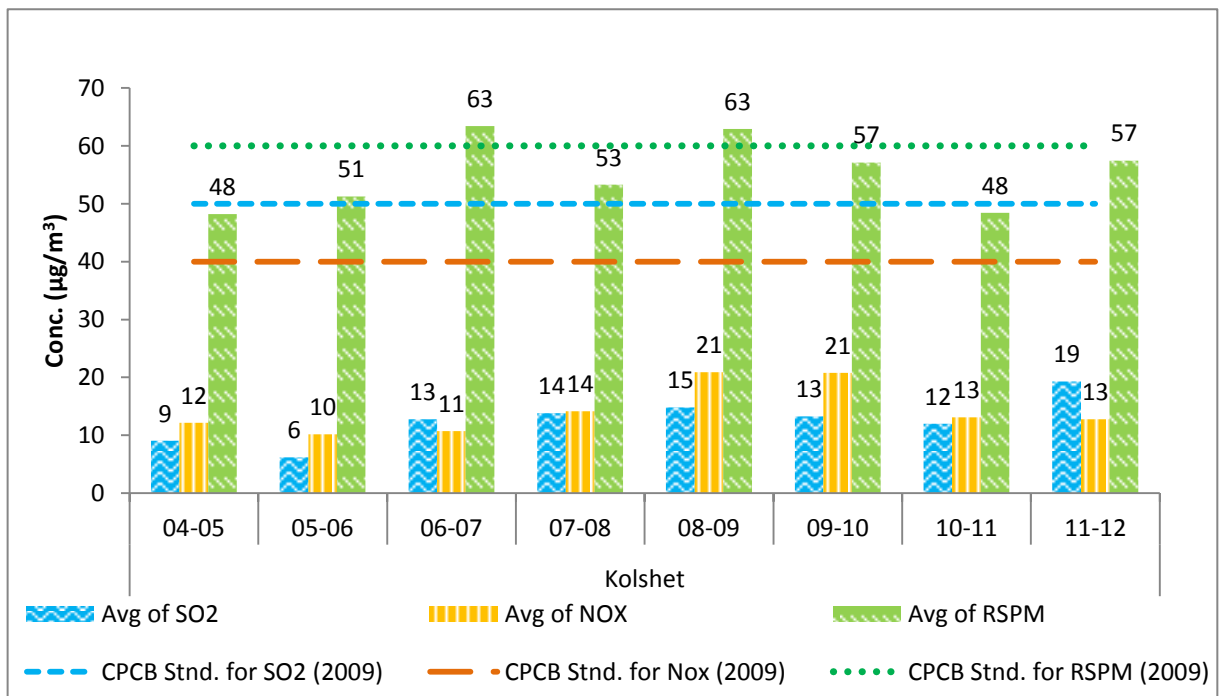


Figure No 154: Annual average trend of SO₂, NO_x and RSPM at Kolshet – Thane

Thane - Kopri

Table No 152: Data for monthly average reading recorded at Kopri – Thane

FY	N	Monthly average ($\mu\text{g}/\text{m}^3$)		
		SO ₂	NO _x	RSPM
2011-12				
Apr	14	8	5	37
May	10	6	9	29
Jun	10	4	0	21
Jul	10	5	9	16
Aug	9	12	9	51
Sep	12	16	12	57
Oct	11	11	7	53
Nov	9	13	9	52
Dec	10	15	13	59
Jan	6	19	12	53
Feb	8	20	12	48
Mar	14	19	12	191
Total N		% of exceedence		
123		0.0	0.0	4.9

Table No 153: Data for annual average trend of SO₂, NO_x and RSPM at Kopri – Thane

Year	N	Annual average ($\mu\text{g}/\text{m}^3$)		
		SO ₂	NO _x	RSPM
Annual Standards		50	40	60
04-05	62	8	11	45
05-06	97	6	9	51
06-07	111	12	10	51
07-08	111	11	10	50
08-09	103	11	16	60
09-10	97	11	13	50
10-11	117	12	11	46
11-12	123	12	9	60

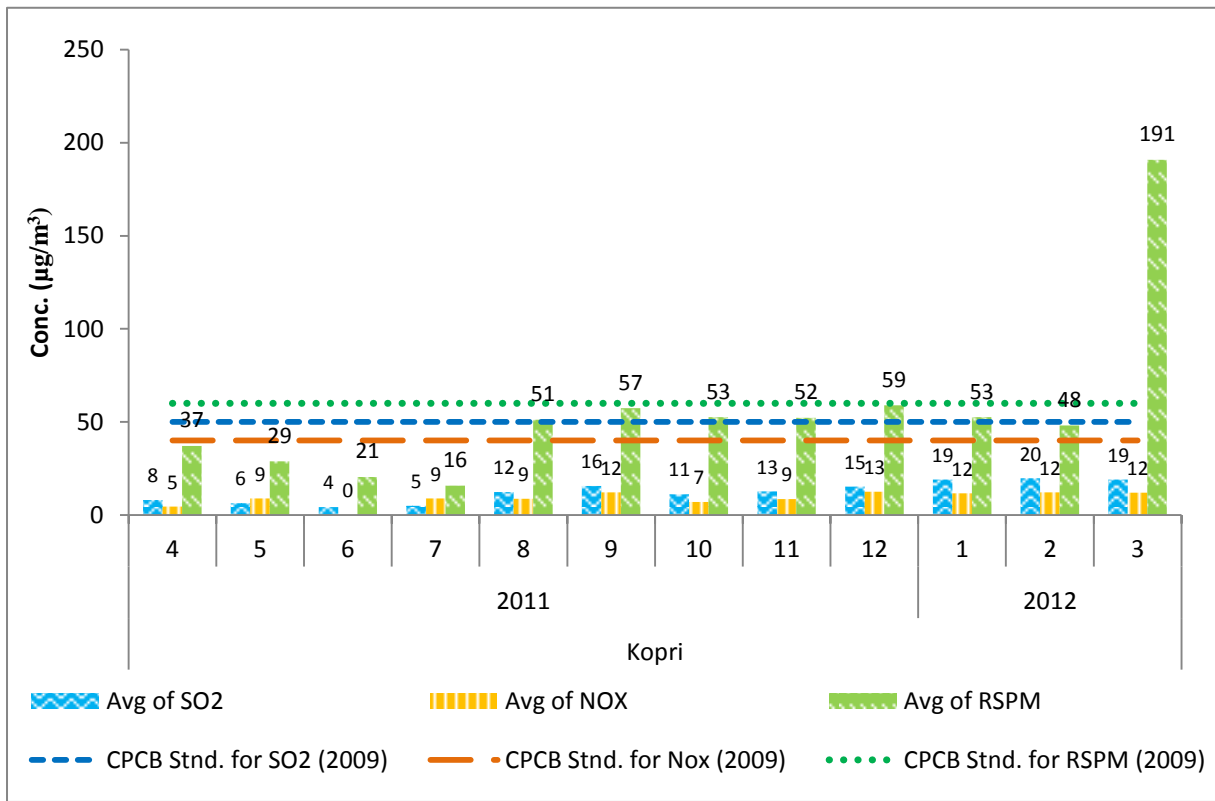


Figure No 155: Monthly average reading recorded at Kopri – Thane

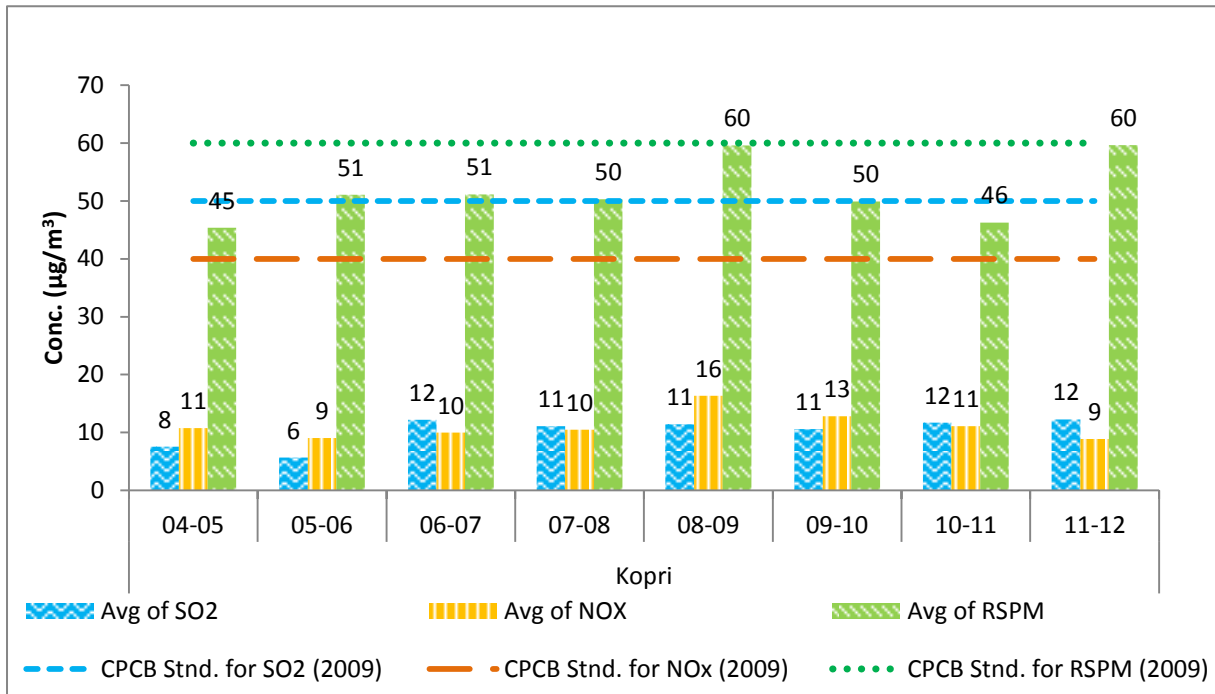


Figure No 156: Annual average trend of SO₂, NO_x and RSPM at Kopri – Thane

Thane - Naupada

Table No 154: Data for monthly average reading recorded at Naupada – Thane

FY	N	Monthly average ($\mu\text{g}/\text{m}^3$)		
		SO ₂	NO _x	RSPM
2011-12				
Apr	12	9	6	39
May	12	7	9	37
Jun	9	5	0	19
Jul	11	5	9	17
Aug	11	13	13	54
Sep	10	15	12	59
Oct	10	17	12	56
Nov	9	16	14	62
Dec	8	16	15	63
Jan	11	19	12	56
Feb	8	20	13	55
Mar	12	19	12	146
Total N			% of exceedence	
123		0.0	0.0	3.3

Table No 155: Data for annual average trend of SO₂, NO_x and RSPM at Naupada – Thane

Year	N	Annual average ($\mu\text{g}/\text{m}^3$)		
		SO ₂	NO _x	RSPM
Annual Standards		50	40	60
04-05	58	8	11	46
05-06	98	6	10	51
06-07	105	12	9	52
07-08	104	11	10	50
08-09	100	11	15	60
09-10	112	14	21	55
10-11	122	14	13	48
11-12	123	13	10	56

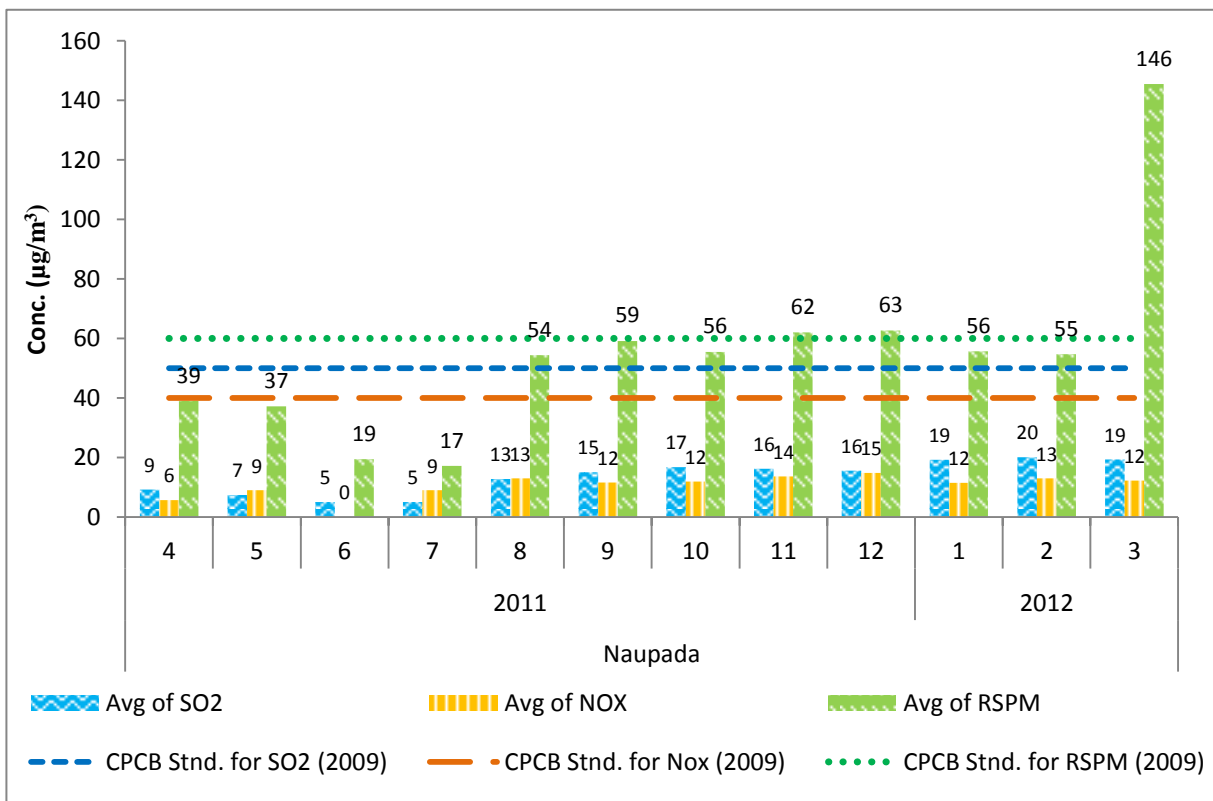


Figure No 157: Monthly average reading recorded at Naupada – Thane

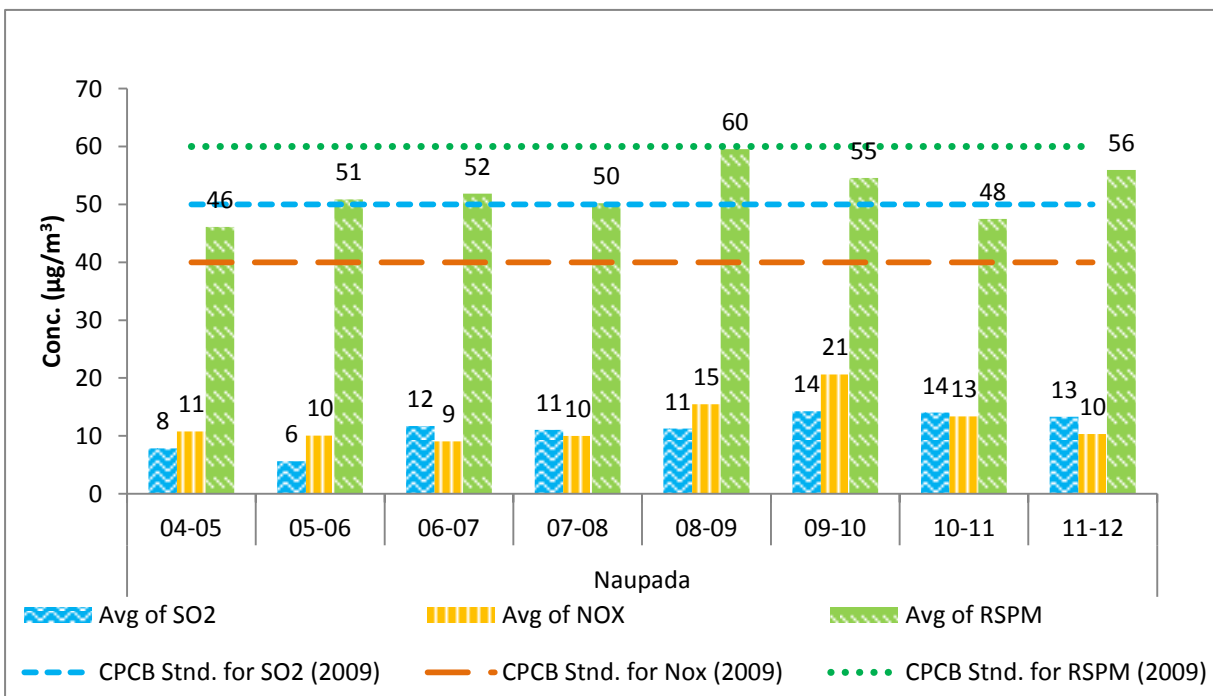


Figure No 158: Annual average trend of SO₂, NO_x and RSPM at Naupada – Thane

Appendix – A: Revised NAAQS 2009

रजिस्ट्री सं. डी. एल. 33004/99

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राष्ट्रीय परिवेशी वायु गुणवत्ता मानक

केन्द्रीय प्रदूषण नियंत्रण बोर्ड

अधिसूचना

नई दिल्ली, 18 नवम्बर, 2009

सं. डी-29016/20/90/पी.सी.आई.-I.—वायु (प्रदूषण निवारण एवं नियंत्रण) अधिनियम, 1981 (1981 का 14) की धारा 16 की उपधारा (2) (एच) द्वारा प्रदत्त शक्तियों का प्रयोग करते हुए तथा अधिसूचना संख्या का.आ. 384(ई), दिनांक 11 अप्रैल, 1994 और का.आ. 935 (ई) दिनांक 14 अक्टूबर, 1998 के अधिक्रमण में केन्द्रीय प्रदूषण नियंत्रण बोर्ड इसके द्वारा तत्काल प्रभाव से राष्ट्रीय परिवेशी वायु गुणवत्ता मानक अधिसूचित करता है, जो इस प्रकार है-

राष्ट्रीय परिवेशी वायु गुणवत्ता मानक

क्र. सं.	प्रदूषक	समय आवृत्ति और सीमा	परिवेशी वायु में सान्द्रण		
			औद्योगिक, शहरी, ग्रामीण और अन्य क्षेत्र	पारिस्थितिकीय संवेदनशील क्षेत्र (केन्द्र सरकार द्वारा अधिसूचित)	प्रबोधन की पद्धति
(1)	(2)	(3)	(4)	(5)	(6)
1	सल्फर डाई आक्साइड (SO ₂), µg/m ³	वार्षिक* 24 घंटे**	50 80	20 80	-उन्नत वेस्ट और गार्डक -परस्वैगनी परिधीयता
2	नाइट्रोजन डाई आक्साइड (NO ₂), µg/m ³	वार्षिक* 24 घंटे**	40 80	30 80	-उपांतरित जैकब और हॉवाइजर (सोडियम-आर्सेनाइट) -ससायनिक संदीप्ति
3	विभिन्न पदार्थ (10माइक्रोन से कम आकार) या PM ₁₀ , µg/m ³	वार्षिक* 24 घंटे**	60 100	60 100	-हरात्मक विश्लेषण -टोयम -बीटा तनुकरण पद्धति

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(1)

4	विविक्त पदार्थ (2.5 माइक्रान से कम आकार या $PM_{2.5}$, $\mu g/m^3$)	वार्षिक* 24 घंटे**	40 60	40 60	-हरात्मक विश्लेषण -टोयम -बीटा तनुकरण पद्धति
5	ओजोन (O_3) $\mu g/m^3$	8 घंटे** 1 घंटा**	100 180	100 180	-पराबैगनी द्विप्तिकाल -रासायनिक संदीप्ति -रासायनिक पद्धति
6	सीसा (Pb) $\mu g/m^3$	वार्षिक* 24 घंटे**	0.50 1.0	0.50 1.0	ई.पी.एम. 2000 या समरूप फिल्टर पेपर का प्रयोग करके AAS/ICP पद्धति -टेफ्लॉन फिल्टर पेपर का प्रयोग करते हुए ED-XRF
7	कार्बन मोनोक्साइड (CO) mg/m^3	8 घंटे** 1 घंटा**	02 04	02 04	-अविपेक्षी अवरक्त (NDIR) स्पैक्ट्रम मापन
8	अमोनिया (NH_3) $\mu g/m^3$	वार्षिक* 24 घंटे**	100 400	100 400	-रासायनिक संदीप्ती -इण्डोफिनॉल ब्ल्यू पद्धति
9	बैन्जीन (C_6H_6) $\mu g/m^3$	वार्षिक*	05	05	- गैस क्रोमेटोग्राफी आधारित सतत विश्लेषक -अधिशोषण तथा निशोषण के बाद गैस क्रोमेटोग्राफी
10	बैन्जो (ए) पाईरीन (BaP) केवल विविक्त कण, ng/m^3	वार्षिक*	01	01	-विलायक निष्कर्षण के बाद HPLC/GC द्वारा विश्लेषण
11	आर्सेनिक (As) ng/m^3	वार्षिक*	06	06	-असंवितरक अवरक्त स्पैक्ट्रोमिती ई.पी.एम. 2000 या समरूप फिल्टर पेपर का प्रयोग करके ICP/AAS पद्धति
12	निकिल (Ni) ng/m^3	वार्षिक*	20	20	ई.पी.एम. 2000 या समरूप फिल्टर पेपर का प्रयोग करके ICP/AAS पद्धति

* वर्ष में एक समान अंतरालों पर सप्ताह में दो बार प्रति 24 घंटे तक किसी एक स्थान विशेष पर लिये गये न्यूनतम 104 मापों का वार्षिक अंकगणीतीय औसत ।

** वर्ष में 98 प्रतिशत समय पर 24 घंटे या 8 घंटे या 1 घंटा के मानीटर मापमान, जो लागू हो, अनुपालन कये जाएंगे । दो प्रतिशत समय पर यह मापमान अधिक हो सकता है, किन्तु क्रमिक दो मानीटर करने के दिनों पर नहीं ।

टिप्पणी:

1. जब कभी और जहां भी किसी अपने-अपने प्रवर्ग के लिये दो क्रमिक प्रबोधन दिनों पर मापित मूल्य, ऊपर विनिर्दिष्ट सीमा से अधिक हो तो इसे नियमित या निरंतर प्रबोधन तथा अतिरिक्त अन्वेषण करवाने के लिये पर्याप्त कारण समझा जायेगा ।

संत प्रसाद गौतम, अध्यक्ष

[चिह्नपत्र-III/4/184/09/असम.]

टिप्पणी: राष्ट्रीय परिवेशी वायु गुणवत्ता मानक संबंधी अधिसूचनाएँ, केन्द्रीय प्रदूषण नियंत्रण बोर्ड द्वारा भारत के राजपत्र आसाधरण में अधिसूचना संख्या का.आ. 384 (ई), दिनांक 11 अप्रैल, 1994 एवं का. आ. 935 (ई), दिनांक 14 अक्टूबर, 1998 द्वारा प्रकाशित की गयी थी ।

NATIONAL AMBIENT AIR QUALITY STANDARDS
CENTRAL POLLUTION CONTROL BOARD
NOTIFICATION

New Delhi, the 18th November, 2009

No. B-29016/20/90/PCI-I—In exercise of the powers conferred by Sub-section (2) (h) of section 16 of the Air (Prevention and Control of Pollution) Act, 1981 (Act No.14 of 1981), and in supersession of the Notification No(s). S.O. 384(E), dated 11th April, 1994 and S.O. 935(E), dated 14th October, 1998, the Central Pollution Control Board hereby notify the National Ambient Air Quality Standards with immediate effect, namely:-

NATIONAL AMBIENT AIR QUALITY STANDARDS

S. No.	Pollutant	Time Weighted Average	Concentration in Ambient Air		
			Industrial, Residential, Rural and Other Area	Ecologically Sensitive Area (notified by Central Government)	Methods of Measurement
(1)	(2)	(3)	(4)	(5)	(6)
1	Sulphur Dioxide (SO ₂), µg/m ³	Annual* 24 hours**	50 80	20 80	- Improved West and Gaeke -Ultraviolet fluorescence
2	Nitrogen Dioxide (NO ₂), µg/m ³	Annual* 24 hours**	40 80	30 80	- Modified Jacob & Hochheiser (Na-Arsenite) - Chemiluminescence
3	Particulate Matter (size less than 10µm) or PM ₁₀ µg/m ³	Annual* 24 hours**	60 100	60 100	- Gravimetric - TOEM - Beta attenuation
4	Particulate Matter (size less than 2.5µm) or PM _{2.5} µg/m ³	Annual* 24 hours**	40 60	40 60	- Gravimetric - TOEM - Beta attenuation
5	Ozone (O ₃) µg/m ³	8 hours** 1 hour**	100 180	100 180	- UV photometric - Chemiluminescence - Chemical Method
6	Lead (Pb) µg/m ³	Annual* 24 hours**	0.50 1.0	0.50 1.0	- AAS/ICP method after sampling on EPM 2000 or equivalent filter paper - ED-XRF using Teflon filter
7	Carbon Monoxide (CO) mg/m ³	8 hours** 1 hour**	02 04	02 04	- Non Dispersive Infra Red (NDIR) spectroscopy
8	Ammonia (NH ₃) µg/m ³	Annual* 24 hours**	100 400	100 400	-Chemiluminescence -Indophenol blue method

(1)	(2)	(3)	(4)	(5)	(6)
9	Benzene (C ₆ H ₆) µg/m ³	Annual*	05	05	- Gas chromatography based continuous analyzer - Adsorption and Desorption followed by GC analysis
10	Benzo(a)Pyrene (BaP) - particulate phase only, ng/m ³	Annual*	01	01	- Solvent extraction followed by HPLC/GC analysis
11	Arsenic (As), ng/m ³	Annual*	06	06	- AAS /ICP method after sampling on EPM 2000 or equivalent filter paper
12	Nickel (Ni), ng/m ³	Annual*	20	20	- AAS /ICP method after sampling on EPM 2000 or equivalent filter paper

* Annual arithmetic mean of minimum 104 measurements in a year at a particular site taken twice a week 24 hourly at uniform intervals.

** 24 hourly or 08 hourly or 01 hourly monitored values, as applicable, shall be complied with 98% of the time in a year. 2% of the time, they may exceed the limits but not on two consecutive days of monitoring.

Note. — Whenever and wherever monitoring results on two consecutive days of monitoring exceed the limits specified above for the respective category, it shall be considered adequate reason to institute regular or continuous monitoring and further investigation.

SANT PRASAD GAUTAM, Chairman
[ADVT-III/4/184/09/Exty.]

Note: The notifications on National Ambient Air Quality Standards were published by the Central Pollution Control Board in the Gazette of India, Extraordinary vide notification No(s). S.O. 384(E), dated 11th April, 1994 and S.O. 935(E), dated 14th October, 1998.



Maharashtra Pollution Control Board

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