Air Quality Status of Maharashtra 2018-19

Maharashtra Pollution Control Board
महाराष्ट्र प्रदूषण नियंत्रण मंडळ

The Energy and Resources Institute

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Prepared for

Maharashtra Pollution Control Board
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Prepared by

The Energy and Resources Institute
...towards global sustainable development

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MAHARASHTRA POLLUTION CONTROL BOARD

FOREWORD

Rapid Urbanisation in Maharashtra over the years, major cities have become centers for commerce, industry and education. Enormous increase in number of vehicles has resulted in increased emission of air pollutants and, as a result, levels of air pollutants such as respirable suspended particulate matter are found to exceed the prescribed standards in these cities.

MPC Board has established Air quality monitoring network in Maharashtra under National and State monitoring Programmes. Also, Board has setup real-time Continuous Air Quality Monitoring Stations (CAAQMS) across the state of Maharashtra to monitor all the parameters notified in National Ambient Air Quality Standards-2009. All these monitoring stations regularly monitor Ambient Air Quality and generate valid Air Quality data which is very useful in assessing the prevailing urban air quality in Maharashtra.

This report presents the compiled statistical analysis of air quality data for the year 2018-19 along with the comparison of last few years. I am sure this report will help all the stakeholders to prepare suitable action plans to improve the air quality which is mandatory under "National Clean Air Programme" to be implemented by all the stake holders.

I appreciate the efforts of team work of TERI, Western Region Centre (WRC), Mumbai and MPC Board in preparing this report.

(Sudhir Srivastava)
Chairman

Date: 04/06/2019

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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, Aurangabad , Pune, Chandrapur, Nashik ,Nagpur, Dombivali 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 2018-19 along with Air Quality status comparison of last few years.

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 Ms. Pranali Chavan *Research Associate*, 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 Dr. V.M. Motghare, *Joint Director* and Shri S.C. Kollur, *Scientific Officer*, MPCB is also appreciated.

(E. Ravendiran, IAS)
Member Secretary

Date:- 04/06/2019.

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Abbreviations

AAQM	Ambient Air Quality Monitoring
AAQMS	Ambient Air Quality Monitoring Station/s
ALRI	Acute Lower Respiratory Infections
AMR	Amravati
AQI	Air Quality Index
Ar	Argon
AUR	Aurangabad
CAAQMS	Continuous Ambient Air Quality Monitoring Station/s
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
IIT	Indian Institute of Technology
INAQS	Indian National Air Quality Standards
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
NAAQS	National Ambient Air Quality Standards
NAMP	National Ambient Monitoring Programme
Ne	Neon
NEERI	National Environmental Engineering Research Institute

NGP	Nagpur
NHK	Nashik
NO_2	Oxides of Nitrogen
NOX	Nitrogen Oxides
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
RGD	Raigad
RO	Regional Office
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
$\mu g/m^3$	Micrograms per cubic meter

Executive Summary

Maharashtra, located in the western part of the country, is the third most urbanized and highly industrialized state in India. In 2017-18, Maharashtra's Gross State Domestic Product (GSDP) share was 14.89% of India's total Gross Domestic Product (GDP), highest among all the states[1]. Being highly urbanized and industrialized, Maharashtra faces the problem of pollution and its associated impacts, like any other industrialized state. Hence the need for measures to regulate the extent of air pollution and circumvent its impacts, especially, on the environment and human health.

Maharashtra State Pollution Control Board (MPCB), a statutory body established in 1970[2], is a major regulatory body responsible for effective implementation of environmental laws and conducting mitigative measures for controlling pollution levels. It can enforce laws and rules and release notifications pertaining to prevent and control pollution thereby ensuring sustainable development in the state. MPCB, with a presence across the state through its 12 Regional offices (RO), regularly monitors pollutant levels through a medium of an established network of Ambient Air Quality Monitoring Stations (AAQMS) installed in various regions across Maharashtra. These AAQMS are installed under the National Air Monitoring Program (NAMP) and State Air Monitoring Program (SAMP). In the year 2018-19, there are 72 active AAQMS in Maharashtra under NAMP (61), SAMP (1) and Continuous AAQMS (CAAQMS) (10).

Levels of criteria air pollutants such as Sulphur Dioxide (SO_2), Oxides of Nitrogen (NOx), Respirable Suspended Particulate Matter (RSPM) are continuously measured and recorded by AAQMS while CAAQMS also monitors other air pollutants like Ozone (O_3), Benzene and Carbon Monoxide (CO) as presented in Table No. 1. The levels of all these air pollutants are depicted in a graphical format against their prescribed standard limits. SO_2, NOx and RSPM levels in the year 2018-19 are presented through illustrations to depict the daily, monthly and annual data sets. Secondary pollutants like Ozone and Carbon Monoxide have been analysed for their eight hourly concentrations while Benzene concentrations were analysed for monthly average concentrations.

[1] https://www.ibef.org/states/maharashtra.aspx
[2] http://mpcb.gov.in/aboutus/constitution.php

Table No. 1: List of parameters monitored by various AAQMS across Maharashtra

Program	Frequency	Station name	SO_2	Oxides of Nitrogen			PM		NH_3	CO	O_3	BTX
				NO	NO_2	NOx	2.5	10				
NAMP & SAMP	Twice a week	62 AAQMS (Annex-1)	✓	--	--	✓	--	✓	--	--	--	--
CAAQMS	Daily	Aurangabad	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
		Chandrapur	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
		Civil Lines, Chandrapur	✓	✓	✓	✓	✓	✓	✓	--	--	✓
		Nagpur	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
		Nashik	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
		Dombivali	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
		Bandra	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
		Airoli	✓	--	--	✓	✓	✓	--	--	--	--
		Karve Road	✓	✓	✓	✓	✓	✓	--	✓	✓	✓
		Solapur	✓	✓	✓	✓	✓	✓	--	✓	✓	--

***Note: Data for the stations at Aurangabad RO (Ganeshnagar, Mutha Chowk and Industrial area – CIDCO)* are not available for the the year 2018-19.**

All the 72 AAQMS recorded SO_2 concentrations well within the daily and annual average. It is worth mentioning that in Kalyan , a region having 10 AAQMS installed in various locations in the cities of Dombivali, Kalyan, Ambernath, Badlapur and Ulhasnagar recorded reduced annual SO_2 concentrations in 2018-19 (between 20-33 $\mu g/m^3$) as compared to the concentration levels recorded in 2017-18 (between 36-73 $\mu g/m^3$). Compared to other areas in Maharashtra, the Kalyan region usually shows higher pollution levels due to the presence of industrial set ups at Dombivali and Ambernath having numerous manufacturing units, including those producing chemicals. In Navi Mumbai, Airoli AAQMS has recorded a decrease in SO_2 concentrations from 58 $\mu g/m^3$ (2017-18) to 31 $\mu g/m^3$ (2018-19) while other stations in the same region recorded annual concentrations within the range of 18-19 $\mu g/m^3$. It is important to note that all regions of Maharashtra were found to have relatively improved values for SO_2 concentrations.However, 29 AAQMS exceeded the annual standard limit (40 $\mu g/m^3$) prescribed for NOx levels. In 2017-18, Mumbai region became prominent for NOx pollution as AAQMS situated at both Sion and Bandra recorded an increase in NOx concentration levels from 78 $\mu g/m^3$ to 83 $\mu g/m^3$ and from 47 $\mu g/m^3$ to 66 $\mu g/m^3$ respectively. Kalyan region, on the other hand, showed a considerable reduction in NOx concentrations. In 2018-19, Powai chowk AAQMS recorded levels of 54 $\mu g/m^3$ as compared to 79 $\mu g/m^3$ in 2017-18. A reduction was also observed at MIDC office Dombivali (from 73 $\mu g/m^3$ to 59 $\mu g/m^3$), Ambernath (72 $\mu g/m^3$ to 58 $\mu g/m^3$), and BIWA House (73 $\mu g/m^3$ to 58 $\mu g/m^3$) in the

same region thereby recording a significant reduction in NOx concentration throughout the Kalyan region. A similar trend of AAQMS registering a decrease in annual NOx concentration was also observed in the Pune region, specifically at Swargate (73 μg/m^3 to 54 μg/m^3), Bhosari, (58 μg/m^3 to 53 μg/m^3), Nal stop (63 μg/m ^{3} to 59 μg/m^3) and Pimpri-Chinchwad BOB Building (60 μg/m^3 to 52 μg/m^3) also. The cities of Amravati, Aurangabad, Chandrapur, Nashik, and Nagpur have reported NOx concentrations less than 40 μg/m^3.

NOx control can be achieved through Fuel denitrogenation – removal of a large part of nitrogen contained in fuel, possible by mixing fuels with hydrogen gas, heating the mixture and using a catalyst to cause nitrogen and gaseous hydrogen to unite, producing ammonia and a cleaner fuel[3]. NOx emissions from vehicles, especially diesel vehicles, can be reduced through Selective Catalytic Reduction (SCR) wherein the system converts harmful NOx into Nitogen (N_2) and Water (H_2O) thereby reducing the impact of older diesel vehicles on air quality[4]. Along with such control techniques, traffic decongestion may also help in significantly lowering the NOx levels. Effective traffic management and periodic exhaust emission testing of vehicles may also be effective in reducing NOx levels in respective areas.

Monitoring of RSPM levels is important because such particles can get embedded deep in the lungs and cause a broad range of health effects including respiratory and cardiovascular diseases. Maharashtra possesses numerous power plants and has a diverse mining and quarrying sector, including coal mining in Chandrapur and Quarrying in areas around Navi Mumbai, hence, the RSPM levels remain high in the state. Ghuggus area in Chandrapur region has recorded the highest RSPM levels for the past 3 years. In the year 2018-19, Ghuggus recorded an annual average RSPM at 181 μg/m^3, three times higher than the standard permissible limit of 60 μg/m^3. Other monitoring stations from the region too recorded high RSPM levels, such as Rajura (134 μg/m^3), Ballarshah (120 μg/m^3), Civil lines – Chandrapur (108 μg/m^3), and Tadali MIDC (107 μg/m^3). This indicates that the air pollution level in the region is high and needs to be addressed urgently with effective mitigative measures. Although the pollutant readings are above prescribed limits, areas such as Dombivali, Ambernath and Powai chowk recorded a decrease in RSPM levels - from 233 μg/m^3, 259 μg/m^3 and 222 μg/m^3 recorded in the previous year (2017-18) to 124 μg/m^3, 116 μg/m^3 and 114 μg/m^3 respectively, in 2018-19. In Mumbai, both stations at Bandra and Sion recorded a slight increase in RSPM levels from 106 μg/m^3 and 146 μg/m^3 in 2017-18 to 111 μg/m^3 and 147 μg/m^3 respectively.

Strict adherence to the guidelines developed for mining and quarrying activities would help reduce levels of RSPM in the area. Appropriate operation and maintenance practices such as use of water mists, wind screens, low dump sites, construction of even and smooth roads, appropriate sweeping of roads must be followed at quarry and mining sites. Strict norms must be implemented in the Construction sector as it is a major source of RSPM in urban areas.

In case of Ozone, levels were found to be within the standard limit (100 μg/m^3) at CAAQMS installed at Bandra, Dombivali and Pune while CAAQMS from Nashik, Solapur, Aurangabad, Nagpur and Chandrapur recorded high levels of ozone in range of 100 – 123

[3] https://www.slideshare.net/farahbain/chapter-4-air-pollution-control-and-tecnologies
[4] https://dieselinformation.aecc.eu/how-to-improve-emissions-caused-by-older-diesel-cars/

μg/m^3 exceeding the standard limit (100 μg/m^3) especially in the winter and summer seasons.

CO levels were found to be exceeding the 8 hourly concentration standard (2.0 mg/m3) in 4 CAAQMS - Bandra, Pune, Nagpur and Solapur. It is worth mentioning that the Dombivali CAAQMS recorded all observations under the prescribed limit as compared to the previous year (2017-18) wherein the levels were found to be exceeding the permissible limit. It was observed that the CO Concentrations exceeded the standard limit mainly in the post-monsoon months (October to February). This trend was observed in almost all CAAQMS installed in Maharashtra region. CO emissions can be reduced by using energy efficient technologies such as adapting green building concepts, travelling in fuel efficient vehicles or the use of e-vehicles over conventional ones, adapting energy conservation practices and increased use of renewable energy sources for energy production.

The standard limit for Benzene as per Central Pollution Control Board (CPCB) is 5 μg/m^3. In 2018-19, Benzene levels were found to be 1.3 times higher as compared to the standard permissible limit (5 μg/m^3) consecutively for 7 months (October 2018 to April 2019) in Nagpur while Dombivali CAAQMS recorded high benzene levels of about 1.2 times higher than the standard permissible limit from September 2018 to March 2019. Chandrapur CAAQMs too recorded high levels of benzene for 4 months. Benzene levels were found to be above the permissible limit predominantly in the winter and summer months. On the other hand, Aurangabad, Bandra, Civil Lines, Chandrapur and Pune CAAQS recorded Benzene concentrations well within the standard permissible limit of 5 μg/m^3.

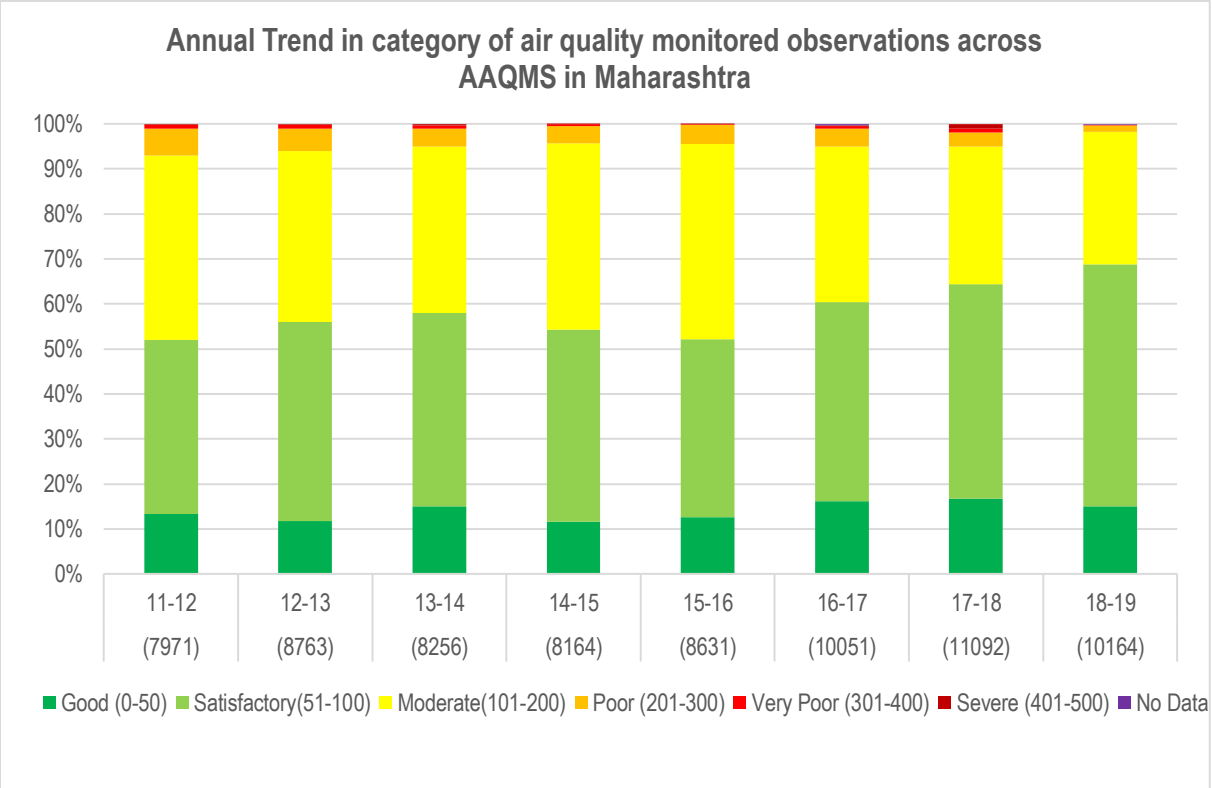


Figure No. 1: Annual trend in share of classes of AQI across Maharashtra for past eight years

In the year 2018-19, total 10,164 observations were recorded across 72 active AAQMS in Maharashtra representing 25 cities. As seen in Figure No. 1, it is worth noting that more than 68% (6996) of the observations were found to be in the 'Good' and 'Satisfactory' category, up from 65% found to be in the same category in 2017-18, thus recording an improvement. The share of observations in the 'Moderate' category recorded a slight decrease from 30.6% in 2017-18 to 29.38% in 2018-19. A similar trend was observed in the case of polluted categories, with percentage share of 'Poor' category observations getting reduced from around 3% to ~1.4% and that of 'Very Poor' category getting reduced from a little less than 2% to merely 0.2% in this year.

Introduction

The natural composition of the atmosphere has been gradually changing over the past few years, due to ever increasing anthropogenic activities, such as burning of fossil fuels like crude oil, coal, natural gas for ever growing industrial and transport sectors, resulting in Air pollution. As per the Air (Prevention and Control of Pollution) Act, 1981 "Air Pollution" is the presence of air pollutants in the atmosphere[5]. Air pollutants can be defined as any solid, liquid or gaseous substance (including noise) present in the atmosphere in a concentration which may tend to be injurious to human beings, plants, property, environment or other living creatures. As per the report of State of Global Air 2019, published by the Health Effects Institute (HEI), India witnessed around 1.2 million deaths due to exposure to outdoor and indoor air pollution[6]. Also, according to a report published by the World Health Organization (WHO) in 2016, 14 Indian cities have been included among the 20 most polluted cities in the world in case of $PM_{2.5}$ levels, while 13 Indian cities were listed among the most polluted in case of PM_{10} levels[7].

The air pollutants are classified as shown below-

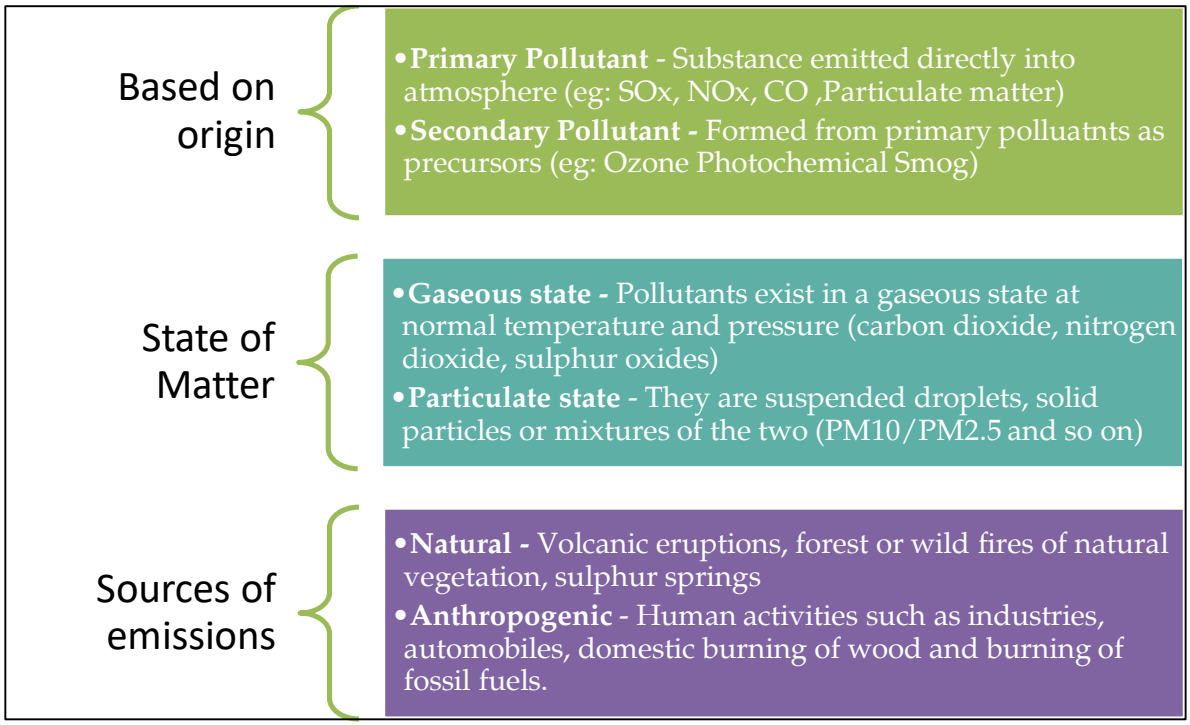


Figure No. 2: Classification of Air pollutants.
Source: http://ecoursesonline.iasri.res.in/mod/page/view.php?id=259408

[5] The air (prevention and control of pollution) act, 1981 (Act No. 14 of 1981)
[6] https://www.stateofglobalair.org/
[7] WHO Global Urban Ambient Air Pollution Database,2016
[8] http://ecoursesonline.iasri.res.in/mod/page/view.php?id=25940

Effects of Air pollutants

Air toxins may cause a broad range of health effects depending on the specific pollutant, the method and duration of exposure. People who inhale high levels of certain air toxins may experience eye, nose and throat irritation, and difficulty in breathing. Long term exposure to these air toxins can cause cancer and long-term damage to the immune, neurological, reproductive, and respiratory systems. Some toxic air pollutants accumulate in the food chain after getting deposited in soil and surface water and even contribute to ozone and particle pollution with associated environmental and climatic effects[9]. Wildlife and livestock may also be harmed with prolonged exposure.

In order to monitor the air quality, a network of Air monitoring stations have been established across the state, with several situated in every region. These stations monitor the criteria pollutants like – Sulphur Dioxide, Oxides of nitrogen, Carbon monoxide, Particulate matter and secondary pollutants like Ozone and so on. The data from these monitoring stations is then used to calculate the Air Quality Index (AQI). AQI is a common and convenient way to represent the air quality status and present the same for public consumption by government agencies, in both developed and developing countries.AQI is constructed in order to match the air quality standards of the country where it is used.

[9] https://gispub.epa.gov/air/trendsreport/2018/#effects

Air Quality Monitoring

Ambient air quality monitoring network is designed to get spatial and temporal variations of ambient air concentrations for a wide range of pollutants that are considered relevant for evolving a strategic management plan. Monitoring helps in assessing the level of pollution in relation to the ambient air quality standards. The monitoring of pollutants is carried out for 24 hours (4-hourly sampling for gaseous pollutants and 8-hourly sampling for particulate matter) with a frequency of twice a week, to have one hundred and four (104) observations in a year. To have a continuous vigilance of the air quality, Central Pollution Control Board (CPCB) has established a nation-wide programme of ambient air quality monitoring known as National Air Quality Monitoring Programme (NAMP). In the current year (2018-19), there are around 731 operating stations covering 312 cities/towns in 29 states and 6 Union Territories of the country[10]. Under NAMP, four air pollutants viz., Sulphur Dioxide (SO_2), Oxides of Nitrogen as NO_2, Particulate Matter (PM_{10}/ $PM_{2.5}$) have been identified for regular monitoring at all the locations.

Active monitoring sites in Maharashtra (2018-19)

At the State level, Maharashtra Pollution Control Board (MPCB) monitors the air quality across Maharashtra through a network of 71 active Ambient Air Quality Monitoring Stations (AAQMS) spread over 25 cities. Out of the total 71 AAQMS, 10 AAQMS are Continuous Ambient Air Quality Monitoring (CAAQMS), 61 are under the National Ambient Monitoring Program (NAMP) and remaining 1 is under the State Ambient Monitoring Program (SAMP). The details of these 72 AAQMS have been represented in Annex -1.

As per the data available each year, the corresponding tally of AAQMS is presented below in Figure No. 3.

[10] http://cpcb.nic.in/about-namp/

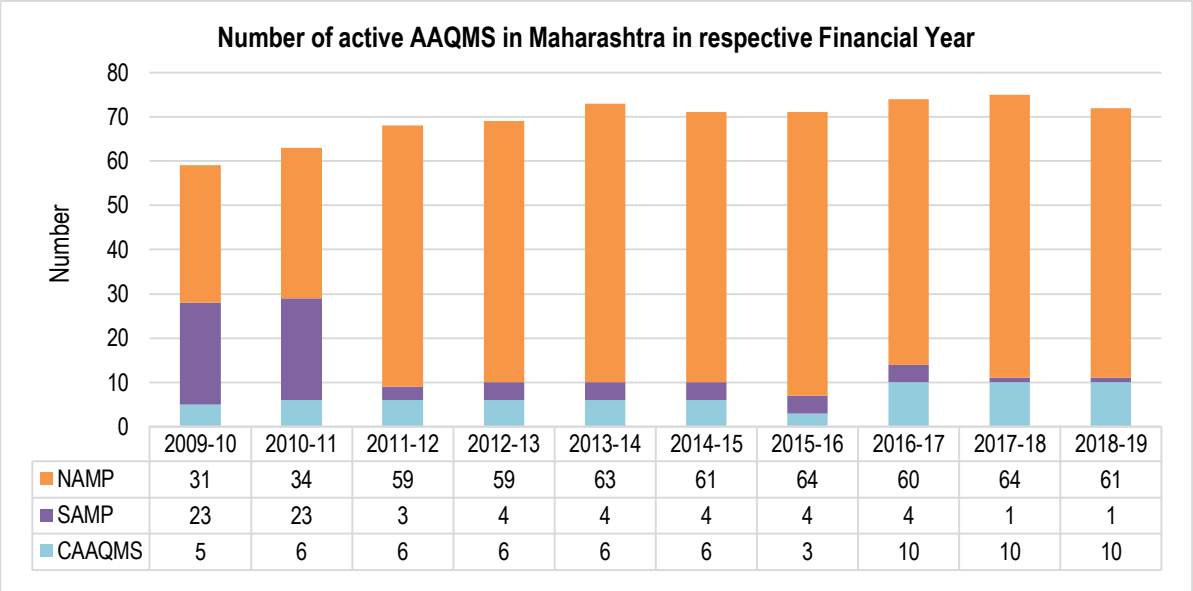


Figure No. 3: Number of active AAQMS in Maharashtra in respective financial year

Source: MPCB, 2019

Table No. 2 : City wise and Program type wise number of AAQMS in Maharashtra

Regional office	City	Monitoring Program			Total
		CAAQMS	NAMP	SAMP	
Amravati	Akola		3		3
	Amravati		3		3
Aurangabad	Aurangabad	1	3		4
	Jalna		2		2
	Latur		3		3
Chandrapur	Chandrapur	2	6		8
Kalyan	Ambernath		1		1
	Badlapur		1		1
	Bhiwandi		2		2
	Dombivali	1	1	1	3
	Kalyan		1		1
	Ulhasnagar		2		2
Kolhapur	Kolhapur		3		3
	Sangli		3		3
Mumbai	Mumbai	1	1		2
Nagpur	Nagpur	1	4		5
Nashik	Jalgaon		3		3
	Nashik	1	4		5
Navi Mumbai	Navi Mumbai	1	3		4
	Taloja		2		2
Pune	Pune	1	4		5
	Solapur	1	2		3
Raigad	Panvel		1		1
Thane	Thane		3		3
Total number		**10**	**61**	**1**	**72**

Continuous Ambient Air Quality Monitoring (CAAQMS):

The Maharashtra State Pollution Control Board has established 10 CAAQMS at 9 cities across the state (Table No. 3) which help monitor real time concentrations of pollutants like Benzene-Toluene-Xylene, Carbon Monoxide (CO), Ozone (O_3), NO, N_2O along with criteria pollutants - SO_2, NOx, Particulate Matter. The CAAQMS also records meteorological parameters like Relative humidity, solar radiation, rainfall, barometric pressure and Wind speed and direction. CAAQMS uses a data logging system to store the data by using various environmental softwares.

Table No. 3: List of CAAQMS across Maharashtra (2018-19)

MPCB RO	Station name		Oxides of Nitrogen		NH_3	CO	O_3	Benzene	Toluene	Ethylene Benzene	Xylene	
		No.	NO	NO_2							m- & p-	o-
Aurangabad	Aurangabad	1	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Chandrapur	Chandrapur	2	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Nagpur	Nagpur	1	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Nashik	Nashik	1	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Kalyan	Dombivali	1	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Mumbai	Bandra	1	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Navi Mumbai	Airoli	1										
Pune	Karve Road	1	✓	✓		✓	✓	✓				
	Solapur	1	✓	✓		✓	✓					
Total		**10**										

Air Quality Monitoring Data

MPCB publishes the data recorded by all the monitoring sites in Maharashtra on its website. It also presents an interactive way to select data according to the time series for a particular monitoring station. The data sets recorded at the monitoring station for the year 2018-19 have been compiled in this report. Monitoring stationwise data showing annual trends for the last 5 years and monthly trends for the year 2018-19 have been presented in a section titled 'Data recorded by AAQMS across Maharashtra 2018-19'.

Picture No. 1: CAAQMS installed at Kurla, Mumbai
Source: Maharshtra Pollution Control Board

Picture No. 2: CAAQMS installed at Colaba, Mumbai
Source: Maharashtra Pollution Control Board

Air Quality Index

With the technological advancements in monitoring techniques and data recording instruments, a vast amount of ambient air quality data gets generated on a daily basis which is then used to determine the air quality of that particular region. The interpretation of such huge datasets becomes very tedious for decision makers and to convey it to the common man is challenging. Since the issue of air pollution is of huge concern in most urban areas, it is very important to convert such databases into a simpler format which could be effectively displayed for public consumption. It should become an effective point of discussion between citizens and decision makers, especially issues concerning air pollution and addressing them in an effective manner.

The air pollution problem can be effectively tackled only through the support of citizens who are well informed about local and national air pollution problems and about the required mitigation measures. In order to achieve this, the concept of an Air Quality Index (AQI) was developed and is used by several nations to effectively represent the air quality scenario in their respective countries[11]. AQI is an air quality guide wherein a color index is used to document air quality. The index provides a single number or a set of numbers by transforming the series of multiple values of respective air pollutants recorded over a span of time. It simply transforms the complex datasets into an easy to understand range of values which gets depicted in the form of different colors indicating the extent of air pollution. Increase in AQI indicates an increased level of air pollution and respective threats to human health associated with these pollutants. Various international environmental agencies such as United States' Environment Protection Agency (US - EPA) have developed their own set of mathematical algorithms to determine AQI, which are based on human exposure dose of air pollutants. In India, CPCB in consultation with the Indian Institute of Technology – Kanpur (IIT-K), developed an AQI system after conducting literature review, understanding air quality monitoring procedures and protocols, Indian National Air Quality Standards (INAQS) and dose-response relationships of pollutants with human health.

[11] http://www.indiaenvironmentportal.org.in/files/file/Air%20Quality%20Index.pdf

Applications of Air Quality Index

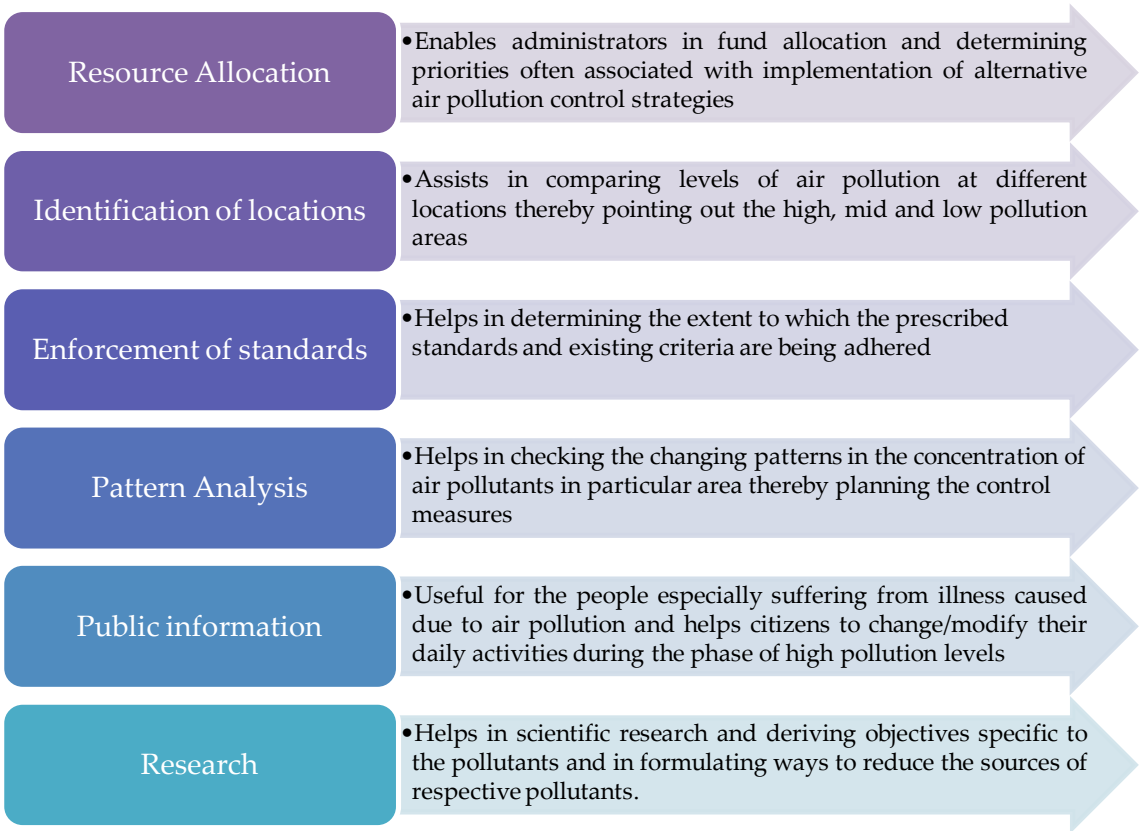


Figure No. 4: Applications of calculating Air Quality Index
Source: http://www.indiaenvironmentportal.org.in/files/file/Air%20Quality%20Index.pdf

Calculation of AQI

The measurement of Air quality is based on the concentration of 8 pollutants namely PM_{10}, $PM_{2.5}$, SO_2, NO_2, O_3, CO, NH_3 and Pb for which short-term (up to 24-hourly averaging period) National Ambient Air Quality Standards (NAAQS) are prescribed by CPCB. The sub-indices for each of these pollutants are calculated with the help of health breakpoint concentration range and 24-hourly average concentration value of respective pollutant except in the case of CO and O_3 (8 hourly).The worst sub index is considered as the AQI for that particular location.

Data of minimum 3 pollutants must be available to calculate overall AQI. Out of the 3 pollutants, one has to be either $PM_{2.5}$ or PM_{10}; otherwise the data is considered as insufficient for AQI calculation. Similarly, data for a minimum period of 16 hours is considered necessary for sub-index calculation. The individual pollutant wise sub-indices data provides the air quality status for respective pollutants.

Table No. 4: Sub-index and breakpoint pollutant concentration for Indian AQI amd its impacts

AQI Category (Range)	PM10 24-hr	PM2.5 24-hr	NO2 24-hr	O3 8-hr	CO 8-hr (mg/ m3)	SO2 24-hr	NH3 24-hr	Pb 24-hr
Good (0-50)	0-50	0-30	0-40	0-50	0-1.0	0-40	0-200	0-0.5
Satisfactory (51-100)	51-100	31-60	41-80	51-100	1.1-2.0	41-80	201-400	0.5 –1.0
Moderate (101-200)	101-250	61-90	81-180	101-168	2.1- 10	81-380	401-800	1.1-2.0
Poor (201-300)	251-350	91-120	181-280	169-208	10-17	381-800	801-1200	2.1-3.0
Very poor (301-400)	351-430	121-250	281-400	209-748*	17-34	801-1600	1200-1800	3.1-3.5
Severe (401-500)	430 +	250+	400+	748+*	34+	1600+	1800+	3.5+

$$I = \frac{(I_{High} - I_{low})}{(C_{high} - C_{low})} * (C - C_{low}) + I_{low}$$

where: I = the (Air Quality) index

C = the pollutant concentration

C_{low}= the concentration breakpoint that is $\leq C$

C_{high}= the concentration breakpoint that is $\geq C$

I_{low}= the index breakpoint corresponding to C_{low}

I_{High}= the index breakpoint corresponding to C_{high}

AQI	AQI Associated Health Impacts
Good (0–50)	Minimal Impact.
Satisfactory (51–100)	Minor breathing discomfort to sensitive people.
Moderate (101–200)	Breathing discomfort to the people with lung disease such as asthma and discomfort to people with heart disease, children and older adults.
Poor (201–300)	Breathing discomfort to people on prolonged exposure and discomfort to people with heart disease.
Very Poor (301–400)	Respiratory illness to the people on prolonged exposure specially in people with lung and heart diseases.
Severe (401-500)	Respiratory effects even on healthy people and serious health impacts on people with lung/heart diseases. The health impacts may be experienced even during light physical activity.

Status of Air Quality

Sulphur dioxide

Molecular Formula (SO_2)

Colourless gas with a pungent, irritating odour and taste. It reacts easily with other substances to form harmful compounds, such as sulfuric acid, sulfurous acid and sulfate particles.

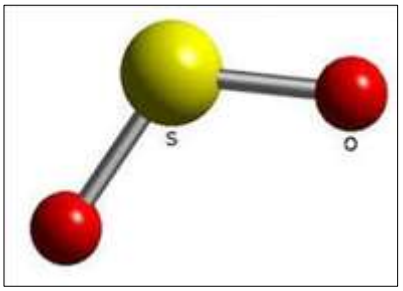


Figure 1: Sulphur Dioxide.

Source:https://edu.glogster.com/glog/sulfur-dioxide/239tgakexua?=glogpedia-source

Effects:

- Respiratory diseases like asthma, bronchitis, emphysema.
- Sulphur dioxide causes irritation to the eyes, resulting in tears and redness.
- High concentration of SO_2 leads to stiffness of flower buds which eventually fall off from plants[12]
- Deposition of sulfur oxides contributes to the acidification of soils and surface waters and mercury methylation in wetland areas.
- Sulfur oxides cause injury to vegetation and species loss in aquatic and terrestrial systems[13]

Oxides of Nitrogen

Molecular Formula: NOx

Oxides of nitrogen (NOx) is the term usually used to refer to nitrogen monoxide (nitric oxide or NO; a colourless and odourless gas) and nitrogen dioxide (NO2; a red-brown gas with a pungent smell which is soluble in water). Nitrogen monoxide reacts with oxygen or ozone in the air to produce nitrogen dioxide.

Effects:

- Irritation of nose and throat, reduced lung function, bronchitis in asthmatic children, visibility impairment, swelling of tissues in the throat and upper respiratory tract, reduced oxygenation of body tissues.
- Affects the Plant growth
- Acid rain, precursor for photochemical smog, eutrophication in water bodies

[12] http://ncert.nic.in/textbook/pdf/kech207.pdf
[13] https://gispub.epa.gov/air/trendsreport/2018/#effects

Particulate matter (PM)

Particulate matter (PM) is a complex mixture of extremely small particles and liquid droplets made up of a number of components, including acids (nitrates and sulphates), organic chemicals, metals and soil or dust particles[14]

Particle pollution includes:

- **PM_{10}**: inhalable particles, with diameters that are generally 10 micrometers and smaller;
- **$PM_{2.5}$**: fine inhalable particles, with diameters that are generally 2.5 micrometers and smaller.

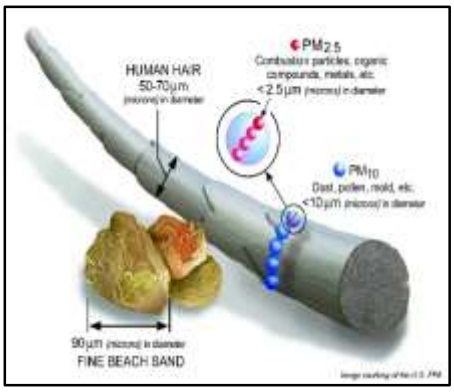


Figure 2: Particulate matter

Source:http://www.irceline.be/en/documentation/faq/what-is-pm10-and-pm2.5

Effects:

- Human Health: Premature death, aggravated asthma, acute respiratory symptoms including aggravated coughing and difficult or painful breathing, chronic bronchitis and decreased lung function.
- Can clog stomata openings of plants and interfere with the function of photosynthesis.

Ozone:

Ozone is found naturally in small concentrations in the stratosphere, a layer of Earth's upper atmosphere which shields us from much of the sun's ultraviolet radiation. Ozone is also found in troposphere (Earth's lower atmosphere), is man-made, and a result of air pollution from internal combustion engines and power plants. Hence, this ozone is also known as bad ozone.

Ground-level ozone (O3) is not emitted directly from anthropogenic sources. It is a "secondary" pollutant formed by a complicated series of chemical reactions in the presence of sunlight. Photochemical reactions of NOx and VOCs (originating largely from combustion processes) govern the concentration of ground-level O3 in the atmosphere

Effects:

- Cause shortness of breath, coughing and sore or scratchy throat
- Inflame and damage the airways.
- Aggravate lung diseases such as asthma, emphysema, and chronic bronchitis.
- Make the lungs more susceptible to infection.
- Cause chronic obstructive pulmonary disease (COPD).

[14] https://www.epa.gov/pm-pollution/particulate-matter-pm-basics

Carbon Monoxide:

Carbon Monoxide (CO) is a colourless, odourless, tasteless, non-irritating and poisonous gas consisting of one carbon and one oxygen atom, connected by a triple bond.

Partial oxidation of carbon-containing compounds leads to production of CO, majorly from exhausts of internal combustion engines, especially by motor vehicles with petrol engines. About 60% of the carbon Monoxide is attributed by human activities whereas natural processes account for the remaining 40%.

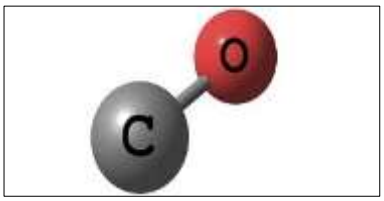


Figure 3: Carbon Monoxide

Source:http://www.courtesyplumbers.com/how-to-protect-your-family-from-carbon-monoxide-poisoning/

Effects:

- Dizziness, nausea (feeling sick) and vomiting, tiredness and confusion, stomach pain, shortness of breath and difficulty in breathing, blue baby syndrome.

Benzene

Benzene belongs to the family of aromatic hydrocarbons which are nonpolar molecules and are usually colorless liquids or solids with a characteristic aroma.

It is a colourless sweet - smelling liquid and is generated whenever carbon-rich materials undergo incomplete combustion. It is highly toxic and is a known carcinogen; exposure to it may cause leukemia.

Effects:

- Benzene increases the risk of cancer and other illnesses.
- Bone marrow failure., anaemia, acute leukaemia
- Benzene targets liver, kidney, lung, heart and the brain and can cause strand breaks of the DNA (Deoxyribonucleic acid), ultimately leading to chromosomal damage.

The Parametric and Monthly graphs of the respective parameters are given in the sections below.

Sulphur Dioxide

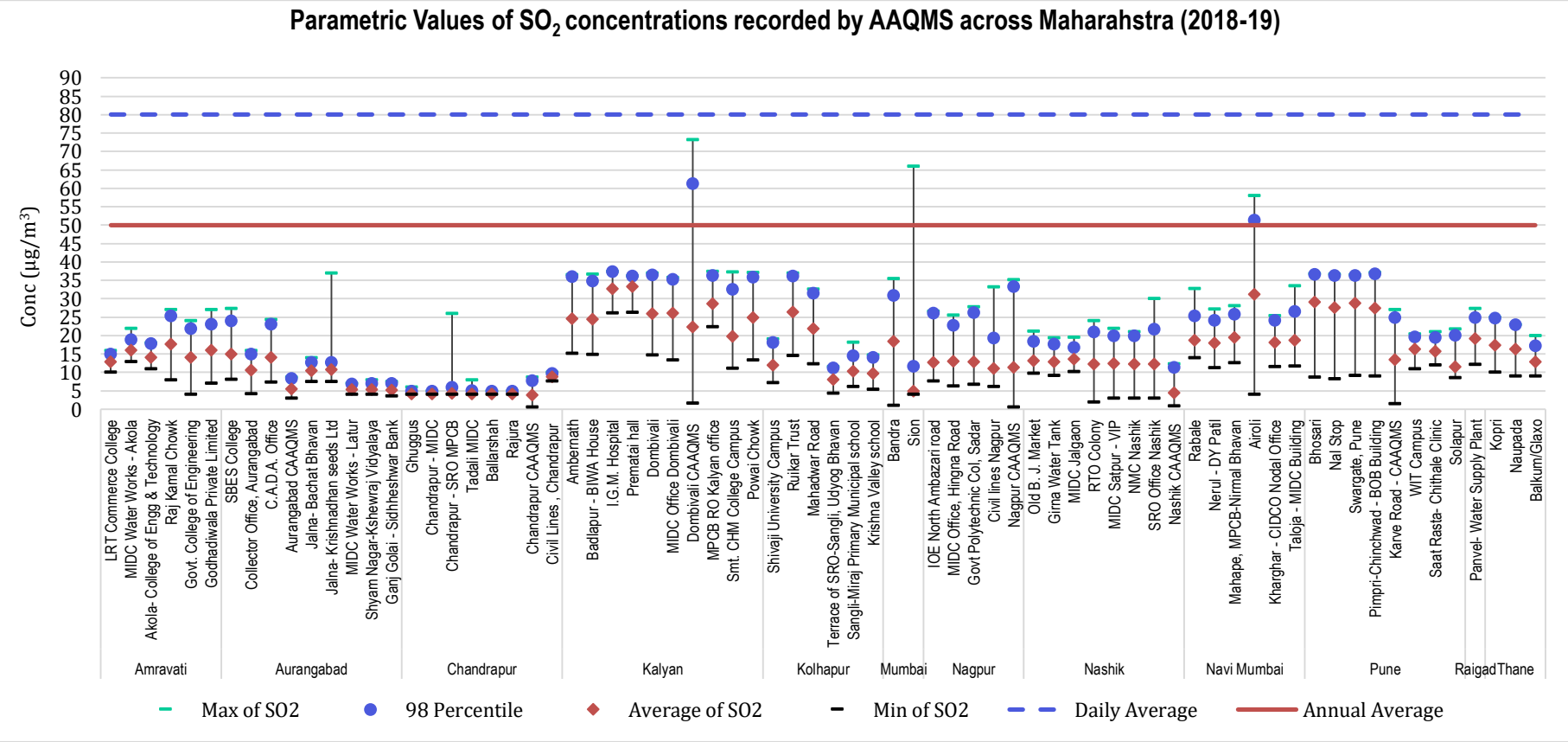


Figure No. 5: Parametric values of SO_2 concentrations recorded by AAQMS across Maharashtra (2018-19)

As seen in Figure No.5, all 72 stations recorded annual SO_2 concentrations within the prescribed limit of 50 µg/m³. It is important to note that, all the regions in Maharashtra were reported to be relatively clean for SO_2 pollution. Table No. 5 depicts stations which recorded high concentration of SO_2 compared to other stations but the concentrations were under the annual standard limit.

It is also important to note that all the 10 AAQMS installed in Kalyan region recorded SO_2 concentration in the range of 20-33 µg/m³ much lower as compared to the range of 36-73 µg/m³ recorded in the previous year (2017-18). AAQMS installed at Smt. CHM college campus recorded 20 µg/m³ of annual average concentration whereas IGM hospital and Prematai hall, both recorded annual average concentration of 33 µg/m³.

Though within the prescribed limit, the second highest annual average SO_2 concentration was recorded at Navi Mumbai's Airoli region (31 µg/m³) wherein the rest of the 5 stations recorded concentrations between 18 and 19 µg/m³. It is worth mentioning that the concentration at Airoli was decreased from 58 µg/m³ (2017-18) to 31 µg/m³ (2018-19) along with other stations from the region.

Similarly, though within the standard limit, second and third highest annual SO_2 concentration was recorded at Pune's Bhosari and Swargate AAQMS. Both recorded concentration level at 29 µg/m³ while other AAMS from Pune region reorded annual average SO_2 levels between 12 to 28 µg/m³.

Table No. 5: Stations with highest SO_2 annual concentration (within the limit) in 2018-19

Sr No	MPCB RO	City	Station Name	Number of days of observations	Average (µg/m³)
1	Airoli	Navi Mumbai	Airoli	328	31
2	Bhosari	Pune	Bhosari	37	29
3	Swargate		Swargate	27	29

Note: All annual SO_2 values are within the standard limit (50 µg/m³)

Trend in Sulphur Dioxide concentrations in Maharashtra

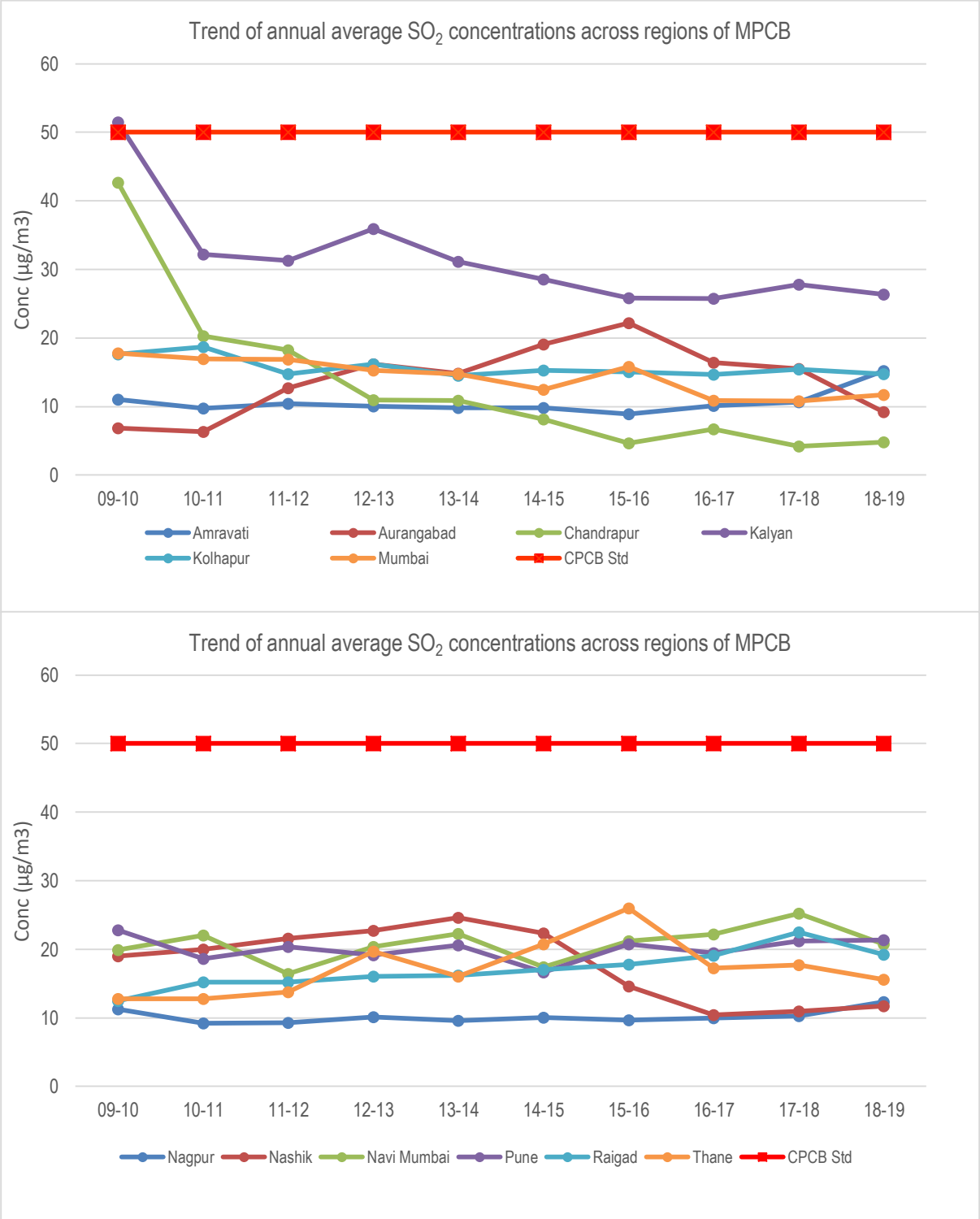


Figure No. 6: Trend in annual SO_2 concentrations across different regions

The annual average of SO_2 concentrations recorded were well within the standard limit prescribed by NAAQS in all regions of Maharashtra. As per the trend observed in Figure No. 6, Aurangabad, Kalyan, Kolhapur, Navi Mumbai, Raigad and Thane regions showed a decrease in SO_2 concentrations while regions such as Mumbai, Amravati, Chandrapur, Nagpur and Nashik, showed a slight increase but were still well below the permissible limit indicating that all regions were relatively clean of SO_2 pollution. Though the levels are below the permissible limit, these regions have continued to show urban infrastructural growth, including in the industrial and commercial sectors. Hence, continuous monitoring and effective mitigative measures need to be taken in advance for avoiding any future problems related to pollution.

The Kalyan region, which consists of the MIDC section of Dombivali and Ambernath has a presence of numerous industries and manufacturing units which are the primary source of pollution in the region. The region recorded a slight decrease in SO_2 concentrations from 28 $\mu g/m^3$ (previous year) to 26 $\mu g/m^3$ in the current year. Neighbouring regions of Thane and Navi Mumbai have also shown a similar trend with levels decreasing from 18 $\mu g/m^3$ to 16 $\mu g/m^3$ and 25 $\mu g/m^3$ to 21 $\mu g/m^3$ respectively.

Although the levels are within the prescribed limit, all these regions have been experiencing rapid development and are getting increasingly urbanized and industrialized. New industrial units are constantly being established along with the existing ones. Hence, appropriate mitigative measures must be taken to keep emissions under control in these regions for which continuous monitoring and implementation of advance pollution control technologies is needed.

Oxides of Nitrogen

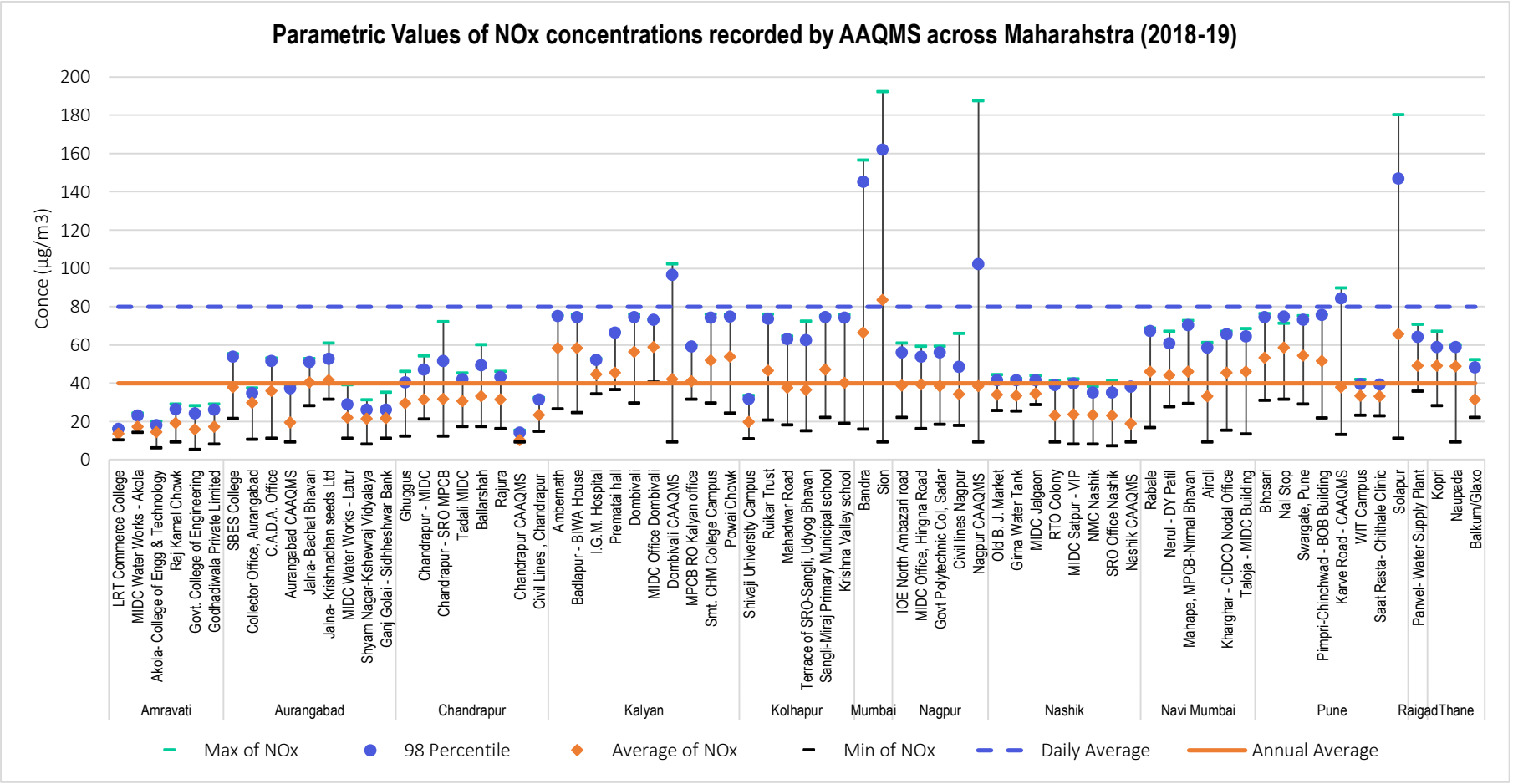


Figure No. 7: Parametric values of NOx concentrations recorded by AAQMS across Maharashtra (2018-19)

In the year 2018-19, 29 AAQMS stations installed across Maharashtra recorded higher NOx concentrations than the prescribed annual standard of 40 µg/m^3. Figure No. 7 contains the list of stations which recorded annual NOx concentrations of 40µg/m^3 or higher.

In Mumbai region, both Sion and Bandra AAQMS recorded high annual NOx concentrations of about 83 µg/m^3 and 66 µg/m^3 respectively. The concentration in Sion has increased from 78 µg/m^3 (2017-18) to 83 µg/m^3 while the Bandra AAQMS recorded NOx concentrations of about 66 µg/m^3 (increased from 47 µg/m^3 in 2017-18), thereby making it a prominent area for NOx pollution.

It is important to note that, though above the prescribed limit of 40 µg/m^3, Powai Chowk (Kalyan region) - which recorded highest NOx concentration in 2017-18 - recorded a lower concentration of about 54 µg/m^3 in 2018-19, thereby showing a considerable decrease in NOx concentration. A similar trend was observed in MIDC Office Dombivali (73 µg/m^3 to 59 µg/m^3), Ambernath (72 µg/m^3 to 58 µg/m^3), and BIWA House (73 µg/m^3 to 58 µg/m^3) in the same region, thus recording a significant amount of reduction in NOx concentrations throughout the Kalyan region.

Out of the 8 AAQMS coming under Pune RO, Solapur AAQMS recorded the third highest annual NOx concentration of about 65 µg/m^3 in 2018-19. Though above the limit, stations installed at Swargate (73 µg/m^3 to 54 µg/m^3), Bhosari (58 µg/m^3 to 53 µg/m^3), Nal Stop (63 µg/m^3 to 59 µg/m^3) and Pimpri-Chinchwad BOB Building (60 µg/m^3 to 52 µg/m^3) registered a decrease in annual NOx concentrations. A similar trend of reduction was recorded in the Saat Rasta-Chitale Clinic AAQMS and Karve Road CAAMS, wherein the NOx concentrations came down within the prescribed limit in 2018-19; the same concentration limit was exceeded by these stations the previous year. Thus, a significant decrease in NOx concentrations was registered in almost all stations except Solapur AAQMS in 2018-19.

In the Thane region, 2 out of the 3 stations - Kopri and Naupada - recorded high NOx concentrations of about 49 µg/m^3, while the station installed at Balkum recorded levels of 31 µg/m^3, which falls within the limit.

The cities of Amravati, Aurangabad, Chandrapur, Nashik, and Nagpur have reported NOx concentrations less than 40 µg/m^3. This year showed a considerable decrease in annual NOx levels throughout the regions.

Table No. 6: Top ten stations which exceeded NOx annual standard (40µg/m³) in 2018-19

Sr No	MPCB RO	City	Station Name	Number of days of observations	Average (µg/m³)
1	Mumbai	Sion	Sion	223	83
2		Bandra	Bandra	360	66
3	Pune	Solapur	Solapur	361	65
4	Kalyan	Dombivali	MIDC Office – Dombivali	45	59
5	Pune	Pune	Nal Stop	45	59
6	Kalyan	Ambernath	Ambernath	66	58
7		Badlapur	Badlapur – BIWA House	60	58
8		Dombivali	Dombivali	72	56
9		Ulhasnagar	Powai Chowk	71	54
10	Pune	Pune	Swargate, Pune	34	54

In the year 2018-19, out of the 12 regions which recorded NOx concentrations, 6 regions - Mumbai, Kalyan, Pune, Raigad, Navi Mumbai and Thane - recorded NOx concentrations that were higher than the standard prescribed limit. (Figure No. 8) Out of these 6 regions, Mumbai region recorded concentrations of 75 µg/m³ (around 90% of the limit) in 2018-19, compared to 60 µg/m³ recorded in 2017-18.

Though the concentrations recorded in Kalyan (51 µg/m³) and Pune (49 µg/m³) were lesser than last year's - 62 µg/m3 and 55 µg/m³ respectively – they were still above the limit. Thane recorded an annual average NOx concentration of 43 µg/m³, which is slightly higher than the standard limit (40 µg/m³), while the Nagpur region recorded a rise in NOx concentration from 32 µg/m³ (2017-18) to 38 µg/m³ (2018-19), thus edging towards the permissible limits. Nagpur, Kolhapur and Nashik regions showed an increasing trend in NOx concentrations, with the levels reaching closer to the standard limits.

Although the Thane region recorded levels of 61 µg/m³ in 2014-15, a decreasing trend was observed since then, and in 2018-19, the levels were recorded at 43 µg/m³, which is very important to note. Navi Mumbai on the other hand showed an increasing trend with levels of 35 µg/m³ (2014-15) to 43 µg/m³ in 2018-19, which is slightly higher than the standard limit.

Trend in Nitrogen Dioxide concentrations in Maharashtra

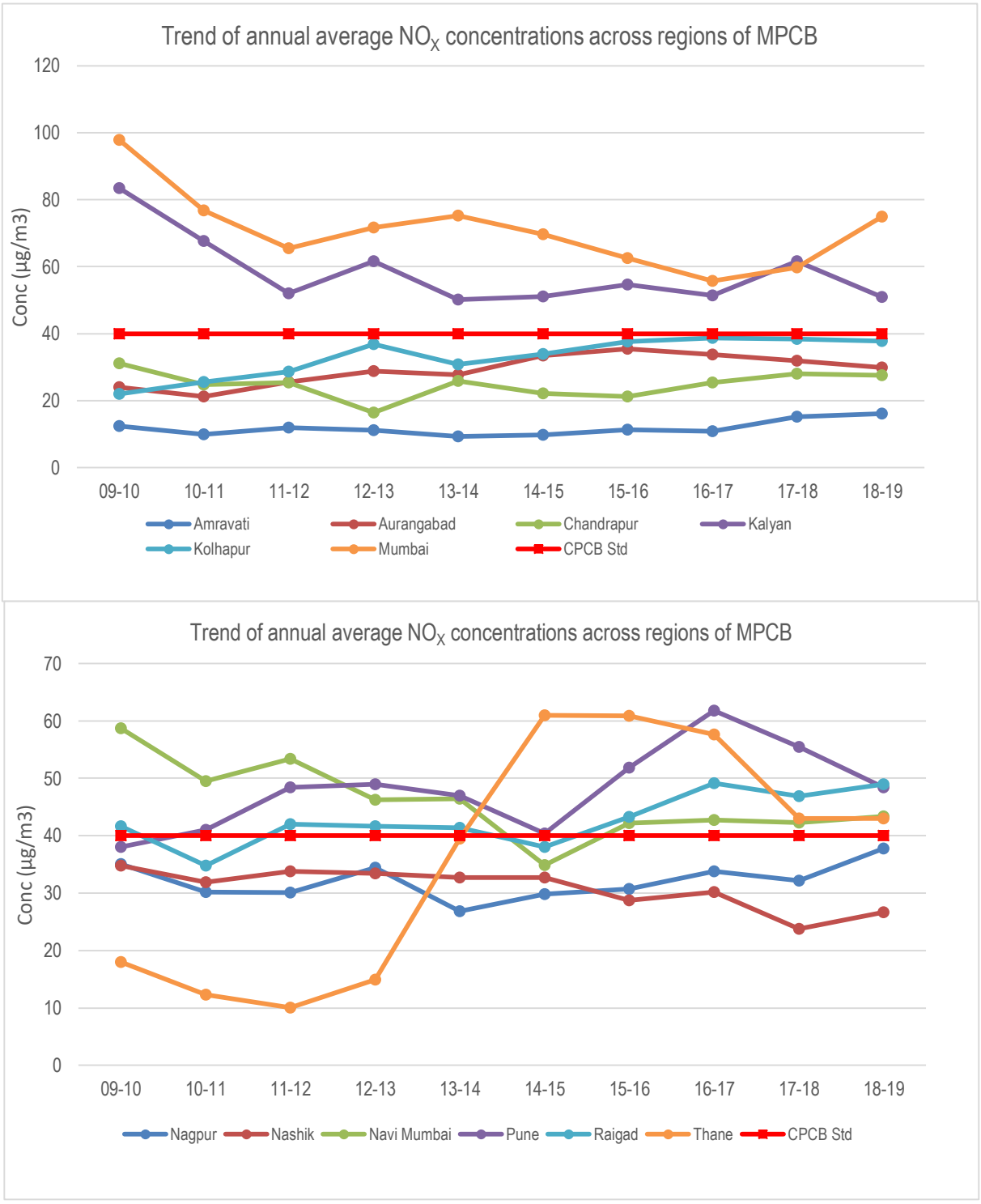


Figure No. 8: Trend in Nitrogen Dioxide concentrations in Maharashtra

Particulate Matter

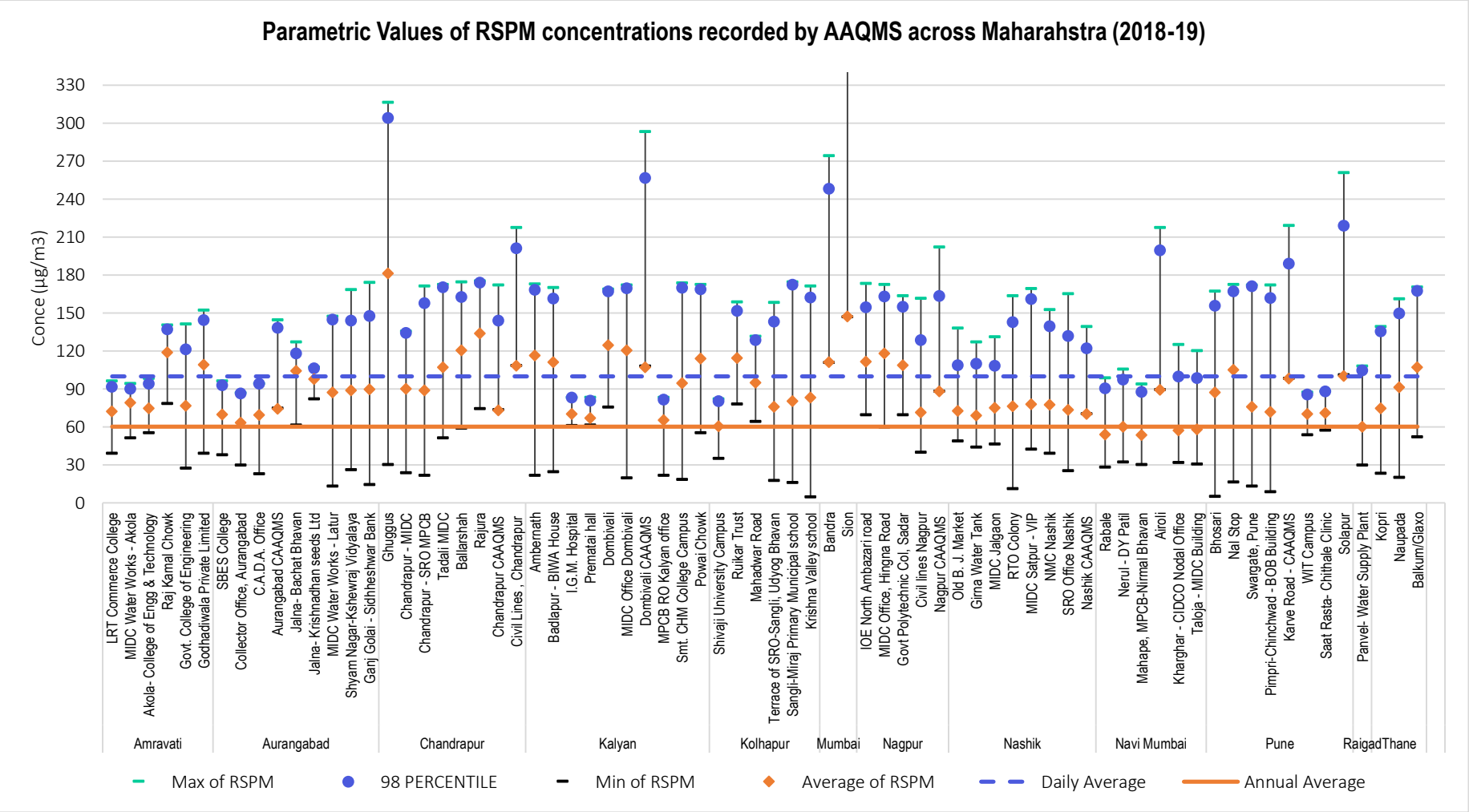


Figure No. 9: Parametric values of RSPM (PM_{10}) concentrations recorded by AAQMS across Maharashtra (2018-19)

RSPM (Respirable Suspended Particulate Matter) is a major cause of conern, as such particles can get deep into the lungs and can cause a broad range of health effects leading to respiratory and cardiovascular diseases. Hence, it is of utmost importance to monitor these levels continuously and to mitigate measures that could lower the RSPM levels in the atmosphere. Maharashtra, being an industrailzed and urbanized state, has always experienced persistently high levels of RSPM. But in this year, 4 stations recorded annual RSPM levels which were found to be under the prescribed limit of 60 µg/m^3, compared to last year wherein only 3 stations recorded levels under the prescribed limit. 3 other stations, namely, Shivaji University Campus (Kolhapur region), Nerul – DY Patil College (Navi Mumbai) and Panvel Water Supply Plant (Raigad) recorded annual RSPM levels of 60 µg/m^3, which is the exact prescribed limit.

Chandrapur region has traditionally recorded increased RSPM levels. Since the region has numerous industrial units, coal mining sites and power plants, the RSPM levels remain considerably high compared to the other regions in Maharashtra. This year too, the highest RSPM concentration in Maharashtra was observed in Ghuggus (Chandrapur region), with an annual average RSPM recorded at 181 µg/m^3, which is three times higher than the standard limit of 60 µg/m^3. Other monitoring stations from the region too recorded high RSPM levels - Rajura (134 µg/m^3), Ballarshah (120 µg/m^3), Civil lines – Chandrapur (108 µg/m^3), Tadali MIDC (107 µg/m^3). This is indicative of the high levels of air pollution in the region which need to be addressed urgently; furthermore, effective mitigative measures need to be undertaken to curb the air pollution problem.

Similar trends were observed in the Kalyan region, which may be attributed to the industrial establishmenst (MIDC) in the areas of Dombivali, Ambernath and Ulhasnagar. The establishments have numerous chemical manufacturing units along with other manufacturing industries. Though above the prescribed limit, areas such as Dombivali, Ambernath and Powai Chowk recorded a decrease in RSPM levels in 2018-19, with levels reaching 124 µg/m^3, 116 µg/m^3 and 114 µg/m^3 respectively, compared to levels of 233 µg/m^3, 259 µg/m^3 and 222 µg/m^3 recorded in the previous year (2017-18). However, all 10 monitoring stations coming under the Kalyan region exceeded the annual RSPM levels, which indicate that the region is having considerable air pollution problems, which need to be addressed; effective measures should also be taken by the competent authorities to improve the air quality.

The Mumbai region, one of the most densely packed megacities in the world, is also facing air pollution problems due to unplanned development, infrastructural activities and increasing emissions from the rising number of vehicles. Both monitoring stations, namely, Bandra and Sion, recorded annual average RSPM concentrations of 111 µg/m^3 and 147 µg/m^3 respectively, which is slightly higher compared to the last year, where the levels recorded were 106 µg/m^3 and 146 µg/m^3 respectively. In the neighbouring Thane region, 3 stations - Kopri, Naupada and Balkum/Glaxo - recorded levels of 75 µg/m^3, 91 µg/m^3 and 107 µg/m^3, which are higher than the annual standard limit of 60 µg/m^3.

In Navi Mumbai, however, only 1 station (Airoli), out of the 6 stations exceeded the RSPM levels, with a concentration recorded at 89 µg/m^3, while the remaining 5 stations recorded levels that were within (the standard limit of 60 µg/m^3.

All 8 stations from Nashik region recorded high RSPM levels within the range of 69 µg/m^3 to 78 µg/m^3, whereas in Amravati region, 4 out of the 6 stations recorded annual RSPM levels between 70 µg/m^3 to 80 µg/m3. The exceptions were Raj Kamal Chowk (119 µg/m^3) and Godhadiwala Private Limited (109 µg/m^3). A list of the Inferior sites which recorded the highest minimum daily RSPM concentrations (in 2018-19) has been provided in Table No.7.

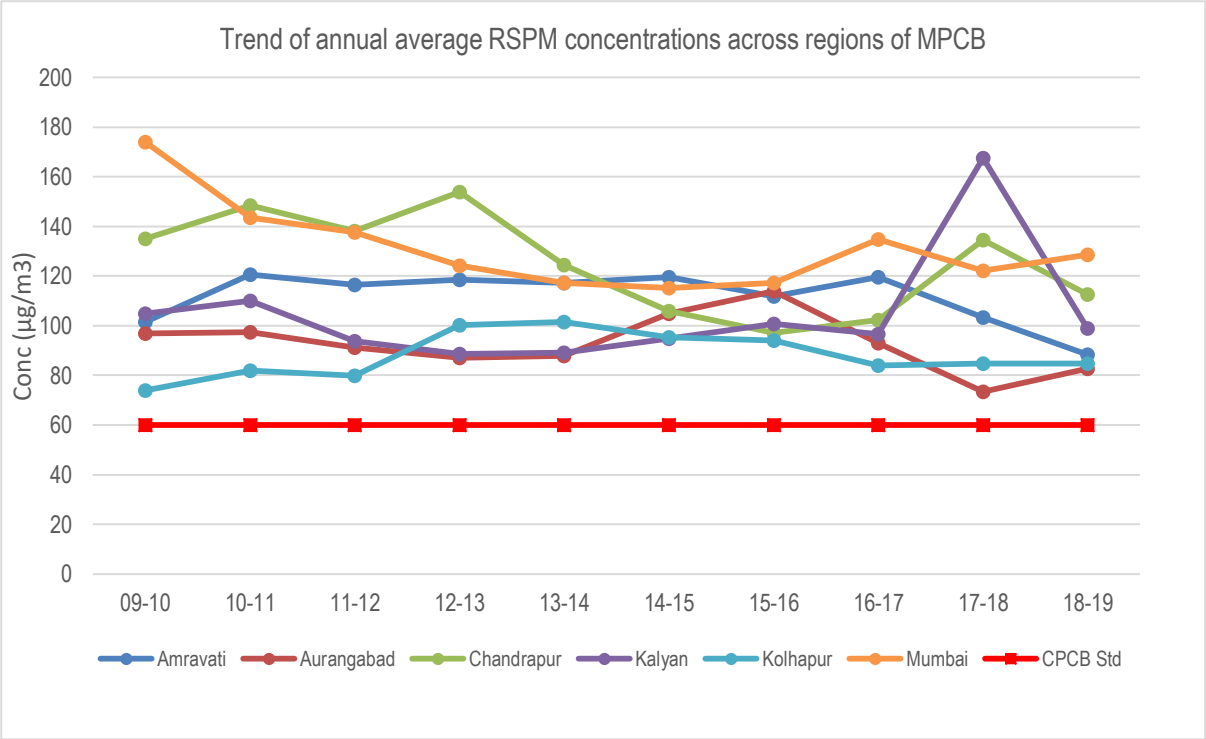
Table No. 7: Ten Inferior sites with AAQMS which recorded the highest minimum daily RSPM concentrations in 2018-19

Sr No	Station Name	Region	Annual Average concentrations (µg/m³)
1	Ghuggus	Chandrapur	181
2	Sion	Mumbai	147
3	Rajura	Chandrapur	134
4	Dombivali	Dombivali	124
5	MIDC Office - Dombivali		120
6	Raj Kamal Chowk	Amravati	119
7	MIDC Office – Hingna Road	Nagpur	118
8	Ambernath	Ambernath	116
9	Powai Chowk	Ulhasnagar	114
10	Ruikar Trust	Kolhapur	114

The levels of RSPM in all regions of Maharashtra have always exceeded the standard limit of 60 µg/m³ (Figure No. 10). Even regions with lower limits of SO_2 and NOx showed trends of high levels of PM concentrations.

Chandrapur, Mumbai and Kalyan regions have always displayed trends of the highest PM levels among other regions. This is primarily due to the presence of industrial establishments and high levels of urbanization. The high levels of RSPM in Chandrapur may be attributed to power plants, cement manufacturing units and coal mining activities.

Trend in RSPM concentrations in Maharashtra



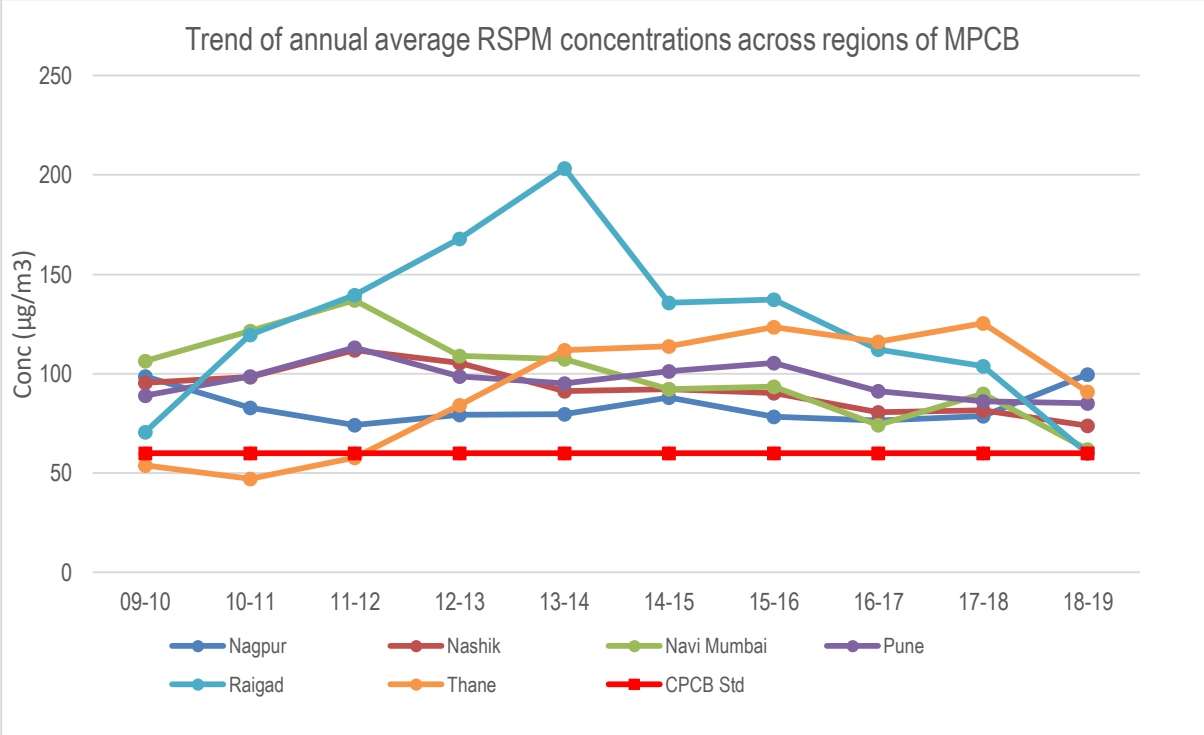
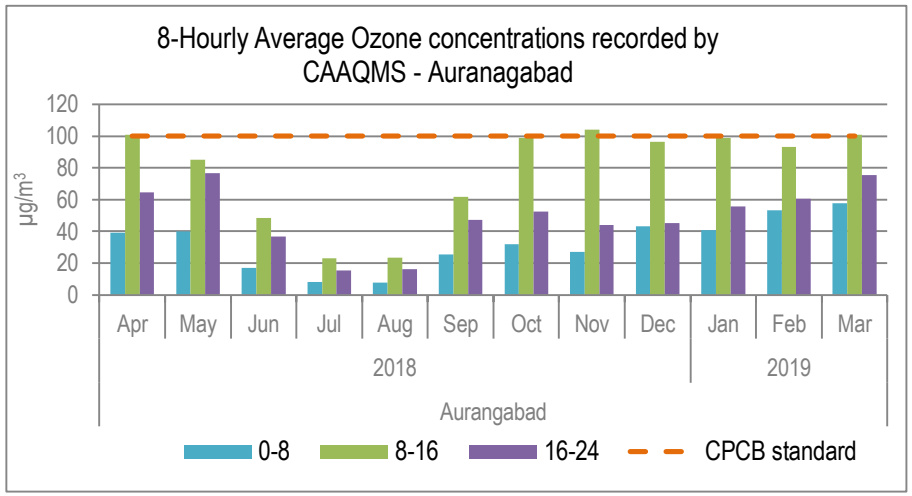
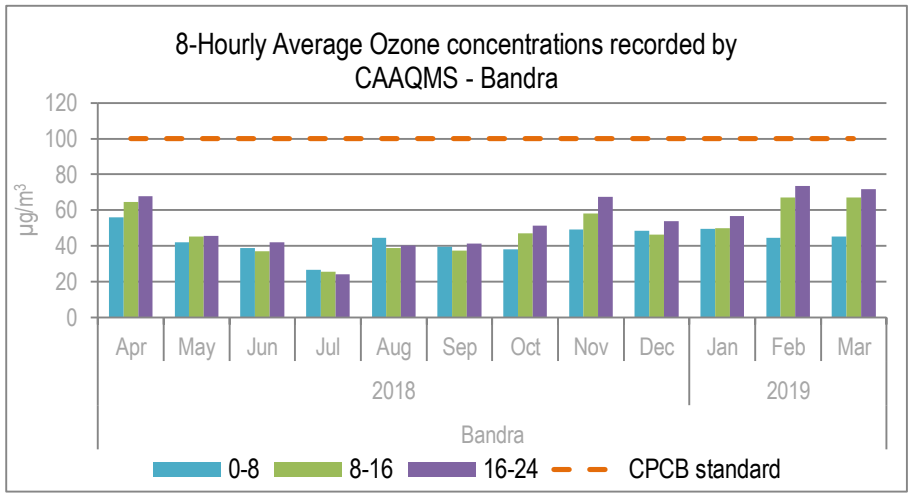
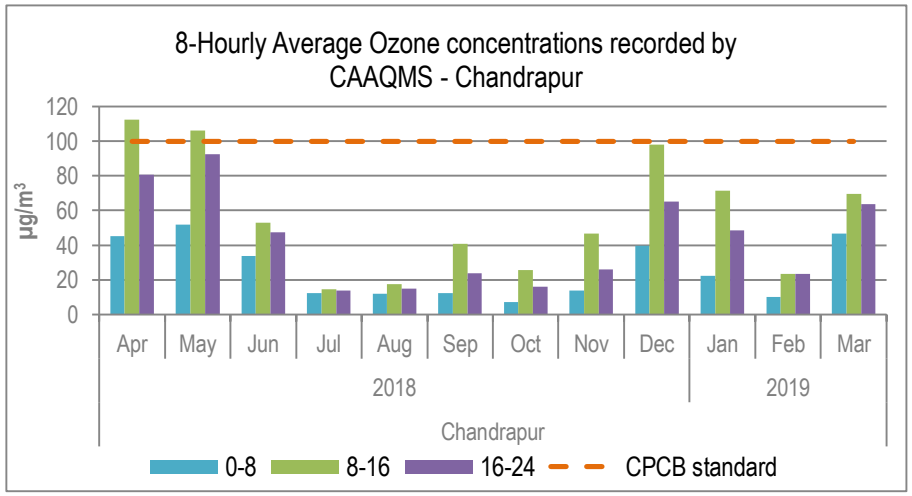


Figure No. 10: Trend in RSPM concentrations in Maharashtra

Ozone







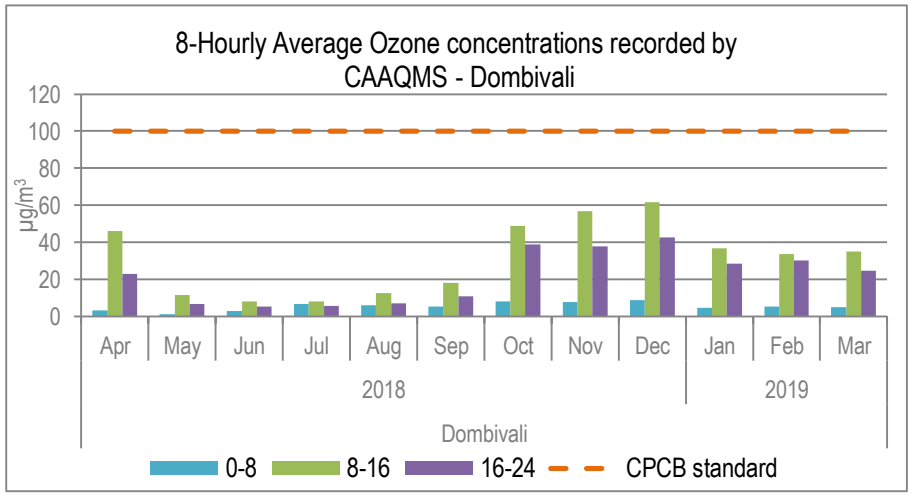


Figure No. 11: 8-hourly monthly average O_3 concentrations recorded by CAAQMS in Aurangabad, Bandra, Chandrapur and Dombivali

Figure No. 12: 8-hourly monthly average O3 concentrations recorded by CAAQMS at Pune, Nagpur, Nashik and Solapur

In 2018-19, 5 CAAQMS, namely Aurangabad, Chandrapur, Nagpur, Nashik and Solapur, recorded Ozone concentrations exceeding the standard limit of 100 µg/m^3. The trend of Ozone concentrations exceeding the limit was observed repeatedly in 3 stations of Aurangabad, Nashik and Solapur, while the concentrations recorded at Chandrapur and Nagpur CAAQMS were under the limit in 2017-18; eventually, however, they exceeded the limit in 2018-19.

At Aurangabad CAAQS, the highest concentration of Ozone (exceeding the standard limit) was observed in the month of November (104 µg/m^3) followed by March (100.9 µg/m^3) and April (100.8 µg/m^3). October, Decembar and January recorded ozone concentrations closer to the prescribed limit, with concentrations of 98.8 µg/m^3, 96.2 µg/m^3 and 98.9 µg/m^3 respectively.

In the case of Chandrapur CAAQMS, months of April (112 µg/m^3) and May (106 µg/m^3) recorded very high Ozone concentrations, whereas the month of December saw the concentration inch closer to the limit, with almost 98 µg/m^3 being noted. In the neighbouring district of Nagpur, the monitoring station recorded excessive Ozone concentrations in the month of February (138.5 µg/m^3 – around 40% more than the standard limit) and March (119.3 µg/m^3 - around 20% more than the standard limit). Thereby, out of all CAAQMS, Nagpur CAAQMS recorded the highest concentration of Ozone in the year 2018-19.

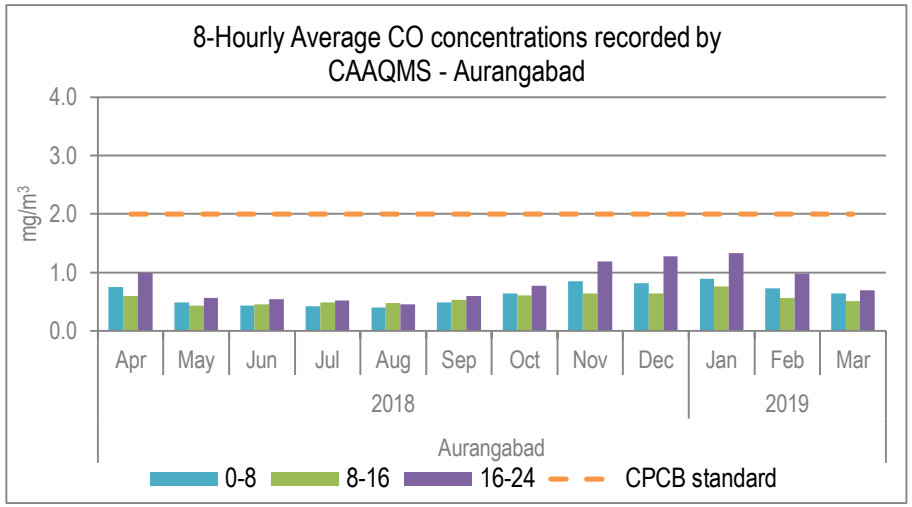
In Nashik, the Ozone concentration recorded for 6 months (October to January and April to May) exceeded the limit, whereas in the month of February (91.6 µg/m^3) and March (99.9 µg/m^3), the concentration was closer to the limit. The highest concentration was recorded in the month of November (123.4 µg/m^3) followed by December (117.4 µg/m^3) and January (109 µg/m^3).

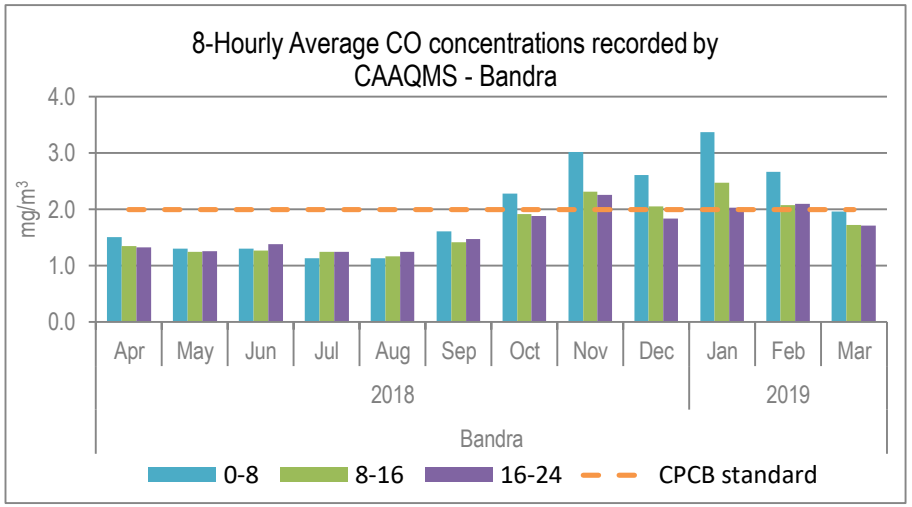
In Solapur, the months of March (100.2 µg/m^3), April (124.6 µg/m^3) and May (110.9 µg/m^3) recorded a high O_3 concentration, while the concentration was within the standard limit of 100 µg/m^3 during the rest of the year.

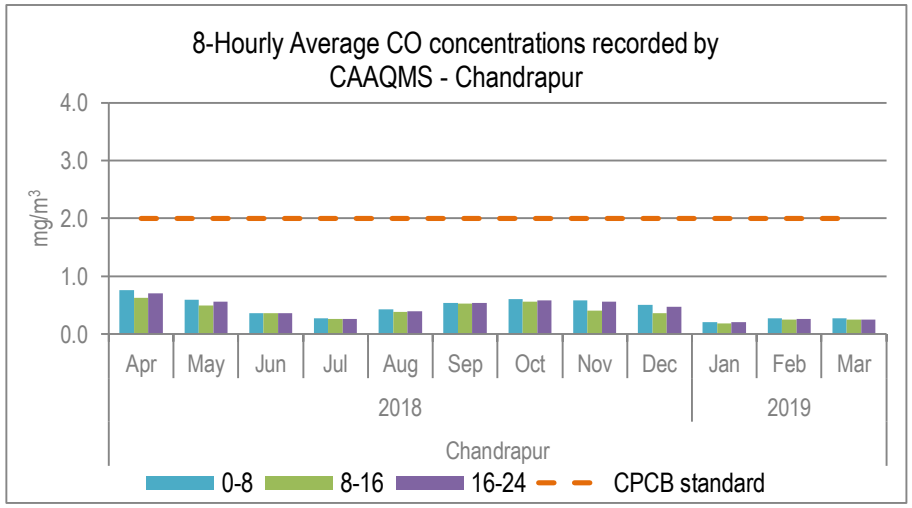
The CAAQMS installed at Bandra, Dombivali and Pune recorded O_3 concentrations that were within the prescribed standard limit of 100 µg/m^3.

Thus, in terms of Ozone pollution, the cities of Nashik, Solapur, Aurangabad, Chandrapur and Nagpur need to implement strategies to reduce the Ozone concentration levels.

Carbon Monoxide







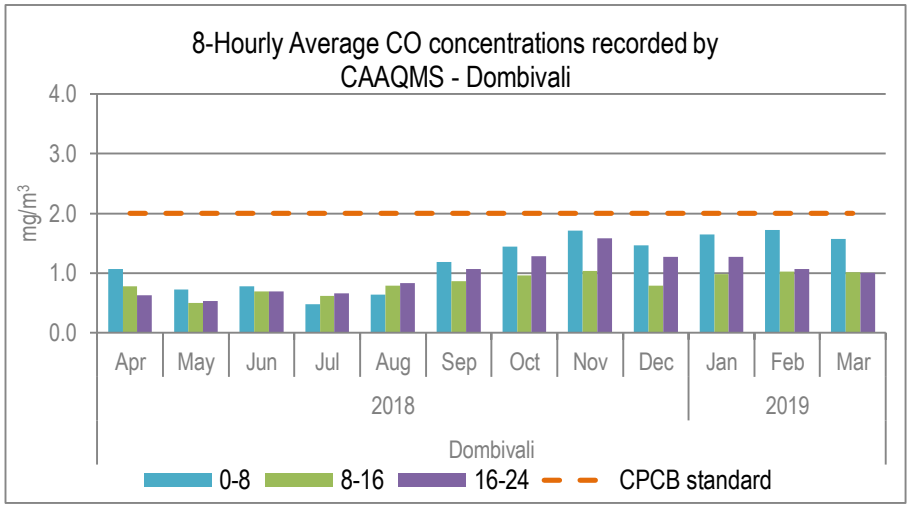


Figure No. 13: 8-hourly average CO concentrations recorded by CAAQMS at Aurangabad, Bandra, Chandrapur and Dombivali

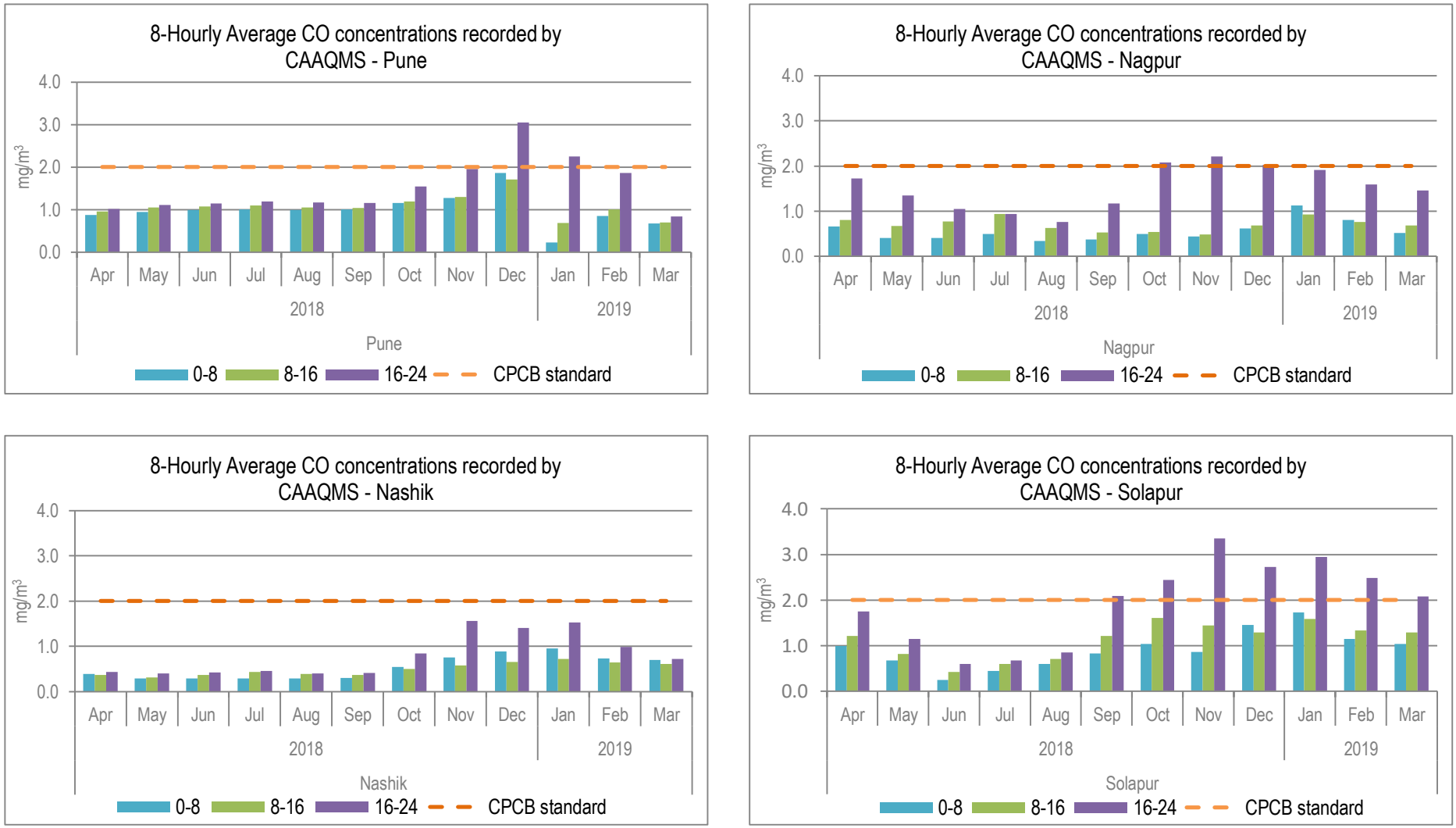


Figure No. 14: 8-hourly average CO concentrations recorded by CAAQMS at Pune, Nagpur, Nashik and Solapur

Out of the 8 CAAQMS that recorded Carbon Monoxide concentrations in the year 2018-19, (Carbon Monoxide

Figure No. 13, Figure No. 14.), 4 CAAQMS - Bandra, Pune, Nagpur and Solapur - exceeded 8-hourly concentration standards of 2 mg/m^3. It is important to note that the Dombivali CAAQMS, which recorded higher CO concentrations in 2017-18, recorded all observations under the prescribed limit.

Bandra CAAQMS recorded CO concentration exceeding the standard limit of 2 mg/m^3 from the period of October 2018 to March 2019. The highest CO concentration was recorded in the month of January, which was more than 50% of the prescribed standard of 2 mg/m^3, while during March, the concentration just reached the level of the standard limit. This trend was observed in the previous year also, wherein the CO concentrations recorded were high during the winter months of November, December and January.

In the case of the Dombivali CAAQMS, high CO concentrations were recorded in the month of February and November (reached standard limit); however, the CO concentrations recorded over the rest of the months were found to be within the limit.

Similarly, Bandra & Pune CAAQMS also recorded high CO concentrations, mainly in winter months of December (3.0 mg/m^3) and January (2.2 mg/m^3). However, the concentrations almost reached the standard limit of 2.0 mg/m^3 during the months of November (1.95 mg/m^3) and February (1.86 mg/m^3). All the other months recorded CO concentrations well within the limit.

The CO concentration was well within the standard limit in Nagpur for the whole year except in the month of October, November and December, when it increased slightly and reached 2.07 mg/m^3, 2.21 mg/m^3 and 2.02 mg/m^3 respectively; in the month of January, it recorded a concentration of 1.91 mg/m^3 which was closer to the standard limit. All the other months recorded CO concentrations well within the limit. Among all the locations, CAAQMS at Solapur recorded CO concentrations exceeding the limit for seven concecutive months from September 2018 to March 2019. The highest concentration of CO was in the month of November (3.34 mg/m^3). Since Solapur CAAQMS recorded high CO concentrations continuously for a prolonged period of time within the year, the problem needs to be addressed and the CO concentration levels need to be brought down.

It was observed that the CO concentration exceeds the standard limit mainly in the post-monsoon months (October to February). This trend was observed in almost all CAAQMS established in the Maharashtra region.

The CAAQMS set up at Aurangabad, Chandrapur, and Nashik recorded CO concentrations that were within the prescribed standard limit of 2 mg/m^3.

Thus, in terms of Carbon Monoxide pollution, the cities of Bandra, Nagpur, Pune and Solapur need to implement strategies to reduce the high levels of carbon monoxide concentration, especially in the winter or post monsoon months. This is because a sharp increase in the concentration levels (above or near the limit) was observed during this period of the year.

Benzene

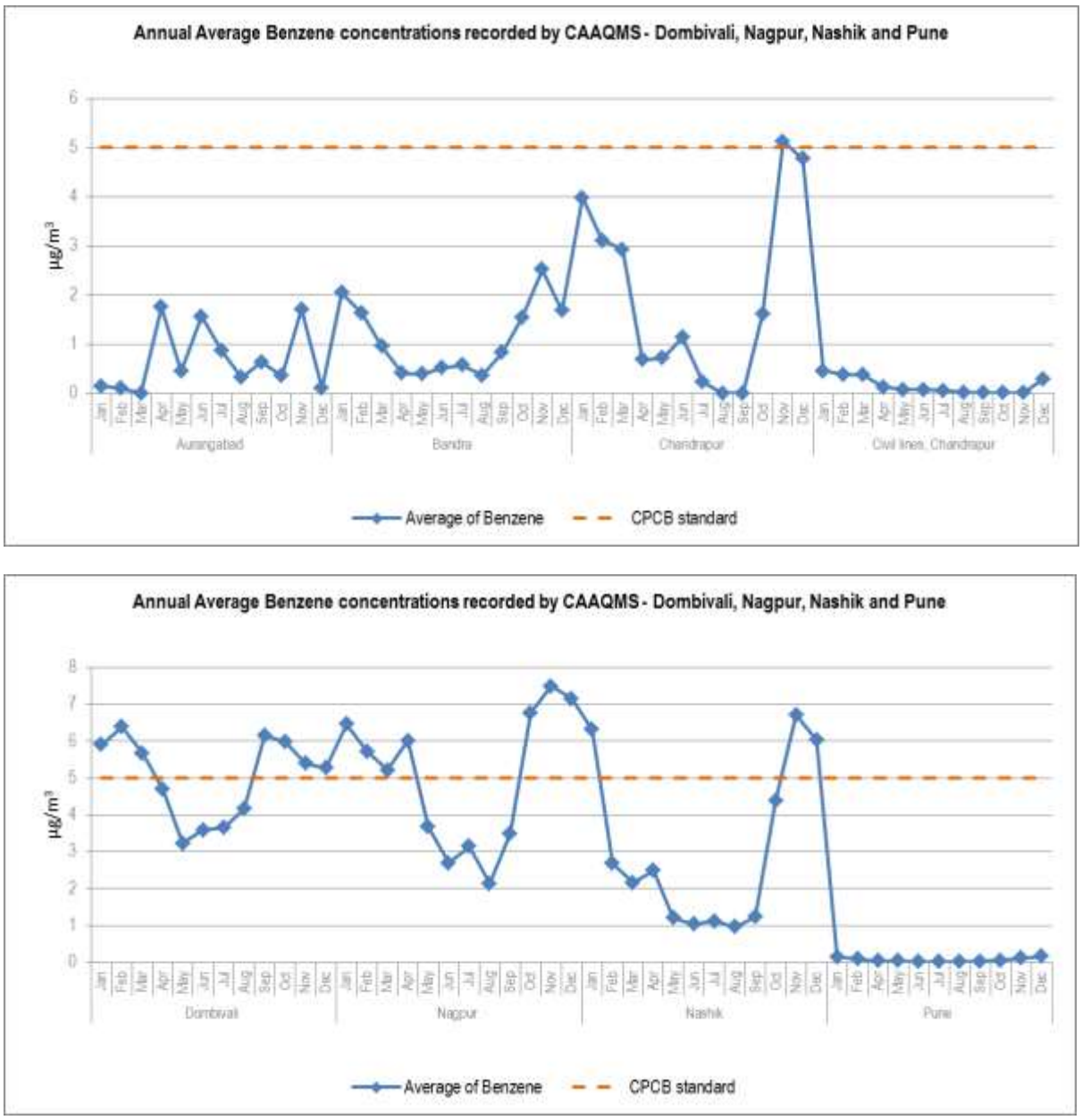


Figure No. 15: Annual Average trend of Benzene concentration recorded at Aurangabad, Bandra, Chandrapur and Civil lines, Chandrapur, Dombivali, Nagpur, Nashik and Pune CAAQMS
Note: No data in the month of March (Aurangabad) and August, September (Chandrapur)

CPCB has set the annual average standard for Benzene as 5 µg/m^3. In 2018-19, the highest annual average of Benzene concentration was recorded at Nagpur AAQMS with a concentration level of around 7.5 µg/m^3 in the month of November. Benzene concentration was found to be above the prescribed standard for a total of 7 months (including November) in Nagpur from October 2018 to April 2019.

A similar case was observed in Dombivali CAAQMS, wherein the annual average Benzene concentration exceeded the standard limit in 7 months, ranging from September 2018 to March 2019. The highest concentration was recorded during the month of February (6.3 µg/m^3) but it is worth mentioning that compared to the previous year, the levels decreased significantly; in 2017-18, the highest Benzene level in Dombivali CAAQMS was in the month of October (14 µg/m^3).

In 2017-18, Chandrapur CAAQMS recorded high Benzene levels for 4 months, with the highest concentration level reaching 10 µg/m3 in the month of November (10 µg/m^3). This year, the Benzene level crossed the limit only slightly in the month of November (5.12 µg/m^3). It was observed that the Benzene concentration increased primarily in winter and summer months.

Aurangabad, Bandra, Civil Lines, Chandrapur and Pune CAAQS recorded Benzene concentrations that were well within the standard limit of 5 µg/m^3. Hence, these regions were relatively clean throughout the year with respect to Benzene concentration levels.

Air Quality Index across Maharashtra (2018-19)

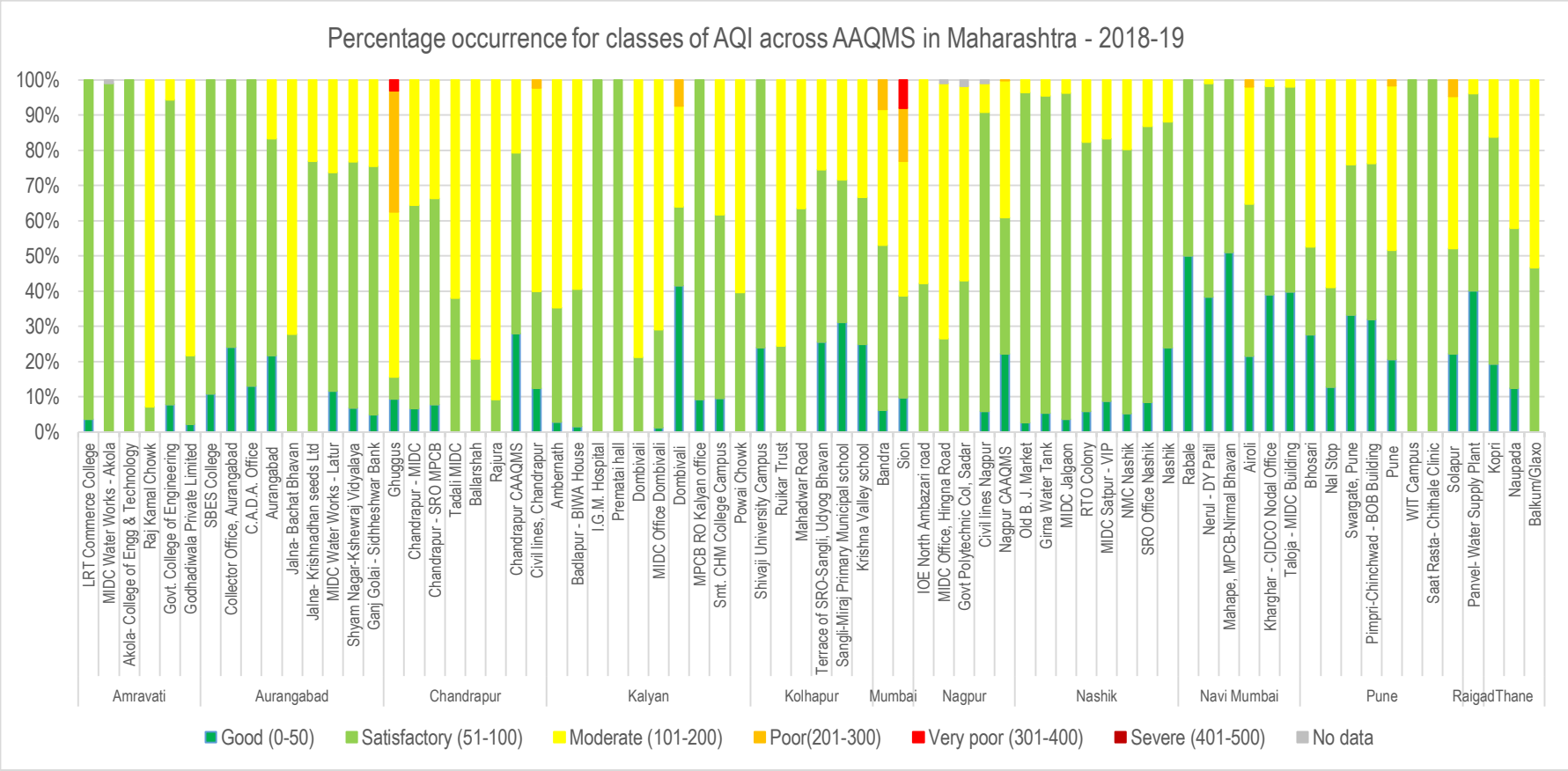


Figure No.16: Percentage occurrence for the classes of AQI across AAQMS in Maharashtra – 2018-19

An overview of the AQI for the reading recorded by the AAQMS in Maharashtra has been calculated using three parameters, viz., SO_2, NOx and RSPM as per the calculation and AQI categories released by CPCB and IIT Kanpur in October 2014. After determining the sub-indices for a region, the highest sub-index from that AAQMS has been considered as the AQI for the area thus represented.

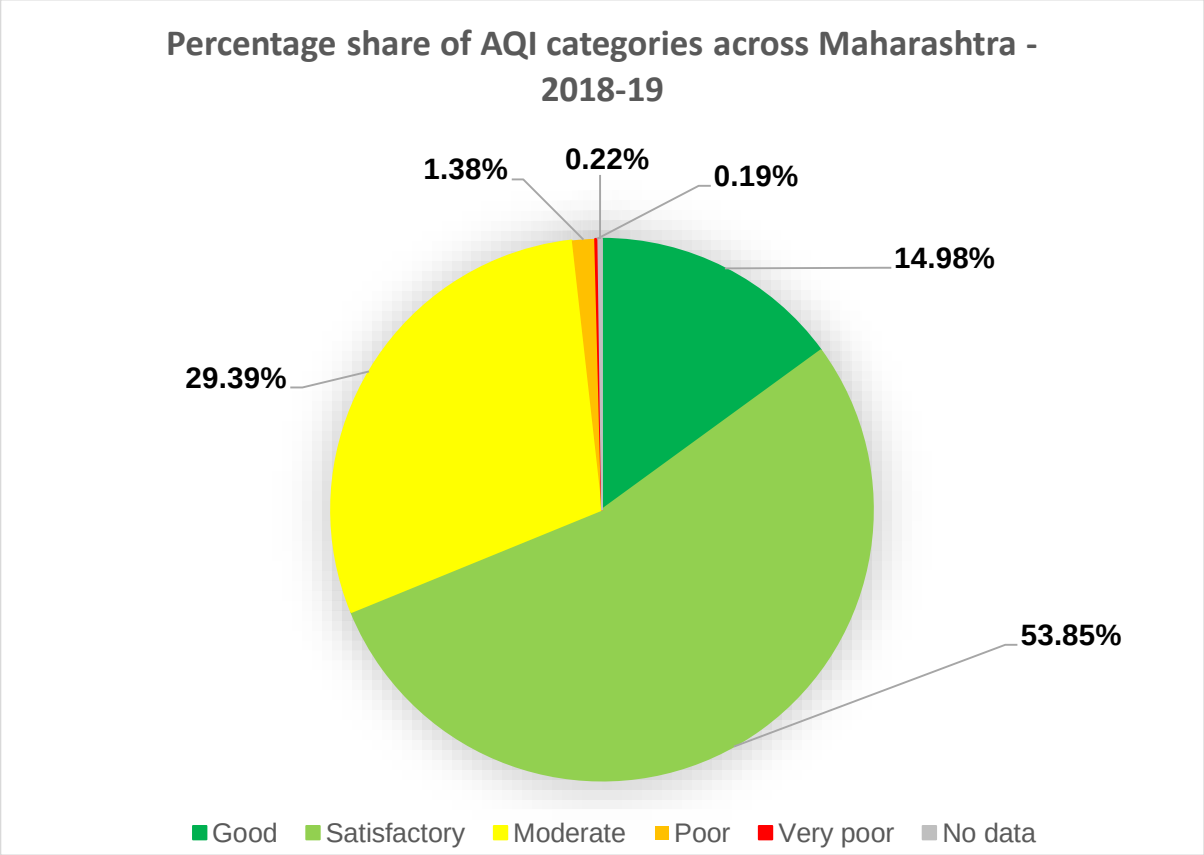


Figure No.17: Share of AQI category for air quality for monitored observations across all AAQMS in Maharashtra (2018-19)[15]

In the year 2018-19, air quality monitoring was done across 72 active AAQMS installed in various regions of Maharashtra. As shown in Figure No.17, around 68.8% observations came under the 'Good' and 'Satisfactory' categories, as compared to 65% in the previous year (2017-18). Thus, an increase in the percentage of non-polluted days by almost 4% was recorded. There was a very slight change in the 'Moderate' category, with 29.4% observations recorded this year compared to 30% in 2017-18. A decreasing trend was observed in the 'Poor' category by more than 2%, from 3% to 1.38% in 2018-19. A similar trend was observed in the 'Very Poor' category, while a very minute part came under 'No Data'.

Out of the 6 stations installed in the Amravati region, 3 AAQMS installed at LRT Commerce College, MIDC Water Works – Akola and Akola College of Engineeering and Technology, recorded observations that were found to be within the category of 'Non-Polluted' ie., the 'Good' and 'Satisfactory' categories. The share of the 'Moderate' category of air quality was very high in Raj Kamal Chowk and Godhadiwala Private Limited, where the share of

[15]*Note: Since the values have been rounded up, some values may appear as zero.*

observations was found to be around 92% and 78% respectively. In the case of Government College of Engineering, around 5% of the observations were recorded under the 'Moderate' category. On the rest of the days, the air quality was recorded as Non-Polluting ('Good' and 'Satisfactory').

In the Aurangabad region, the AAQMS installed at SBES College, Collector's Office - Aurangabad and CADA Office recorded all the observations under the 'Good' and 'Satisfactory' categories, while more than 73% of the observations recorded at MIDC Water Works – Latur, Shyam Nagar - Kshewraj Vidyalaya and Ganj Golai - Sidhheshwar Bank were found to be under the 'Non-Polluted' category. Similar trends were observed in the Aurangabad AAQMS, with more than 80% of the observations falling under the 'Good' and 'Satisfactory' categories. The AAQMS installed at Jalna Bachat Bhavan has a high share of observations under the 'Moderate' category (~72%). This trend was observed in the previous year also, indicating a consistently high level of pollution compared to other stations from the Auranagabad region.

In the Nagpur region, the percentage share of observations coming under the 'Moderate' category was found to be high in AAQMS installed at IOE North Ambazari Road (58%), MIDC Office – Hingna Road (~72%) and Government Polytechnic College, Sadar (~55%), with the remaining observations coming under the 'Satisfactory' category of AQI. Civil Lines – Nagpur and Nagpur CAAQMS, on the other hand, recorded a high percentage of observations under the 'Good' and 'Satisfactory' categories, with a percentage share of around 94% and ~61% respectively.

Ghuggus site in Chandrapur recorded 46.87% days under 'Moderate', 34.3% under 'Poor', 8% under 'Very Poor' with only 15.1% days under the 'Good' and 'Satisfactory' categories. But compared to the previous year, the percentage of non-polluted days increased from around 5% in 2017-18 to around 15% in 2018-19. Sites of Tadali, Ballarshah and Rajura recorded maximum days under the 'Moderate' category, with percentage shares of around 62%, 79% and 91% respectively, while the remaining days were recorded under the 'Satisfactory' categories, with percentage shares of around 38%, 21% and 9% respectively. In the case of Chandrapur MIDC and Chandrapur SRO, the MPCB recorded majority of its observation days (~64% and ~66% respectively) under the 'Good' and 'Satisfactory' AQI categories, while the remaining days (~36% and ~34% respectively) came under the 'Moderate' category.

In the Kalyan region, 4 AAQMS recorded a high percentage of observations under the 'Moderate' category, which includes Ambernath (~64%), Badlapur – BIWA House (59.37%), Dombivali (78.6%) and Powai Chowk (60.3%). AAQMS installed at IGM Hospital and Prematai Hall recorded all observation days under the 'Satisfactory' category. The Dombivali CAAQMS recorded around 64% observations under the 'Good' and 'Satisfactory'categories, around 28% under the 'Moderate' category and around 7% under the 'Poor' category.

In the Kolhapur region, only 1 AAQMS out of the 6 CAAQMS installed - the AAQMS at Shivaji University - recorded all the observation days under the 'Good' and 'Satisfactory' categories. The AAQMS installed at Ruikar Trust recorded a higher percentage of observations under the 'Moderate' category (~75%), as compared to the remaining 25% under the 'Satisfactory' category. Around 63% of the observations recorded at the Mahadwar Road AAQMS came under the 'Satisfactory' category, with the remaining 27% observations under the 'Moderate' category. AAQMS installed at Terrace of SRO - Sangli, Udyog Bhavan, Sangli-Miraj Primary Municipal School and Krishna Valley School recorded

major readings under the 'Good' and 'Satisfactory' categories, with a share of around 74%, 71% and 66% respectively.

The Nashik region recorded a high share of observations under the 'Good' and 'Satisfactory' AQI categories, with more than 90% of the observations recorded from AAQMS installed at Old B. J. Market, Girna Water Tank and MIDC Jalgaon. A similar trend was observed in the AAQMS installed at RTO Colony, MIDC Satpur, NMC Nashik, SRO Office and Nashik, where more than 80% of the observations were found to be under the 'Good' and 'Satisfactory' categories. In Nashik AAQMS, nearly 88% observations were found to be under the 'Good' and 'Satisfactory' categories, with the balance 12% falling under the 'Moderate' category.

In Mumbai, AAQMS installed at Bandra recorded around 53% of the observations under 'Good' and 'Satisfactory', 38.4% under 'Moderate' and around 8% under the 'Poor' categories, while in Sion AAQMS, 38.6% of the observations were recorded under the 'Good' and 'Satisfactory' categories, 38.2% under the 'Moderate' category, 15% under the 'Poor' category and around 8% under the 'Very Poor' category, indicating an increase in the level of pollution in this region. With regard to Navi Mumbai, a majority of the observations (more than 95%) recorded at AAQMS at Rabale, Nerul - DY Patil, Mahape, MPCB - Nirmal Bhavan, Kharghar - CIDCO Nodal Office and Taloja - MIDC Building were found to be under the 'Good' and 'Satisfactory' categories. AAQMS at Airoli recorded 64.7% observations under the 'Good' and 'Satisfactory' categories, 33.33% under the 'Moderate' category and 2% under the 'Poor' category.

Cities of Pune, Solapur and Pimpri-Chinchwad come under MPCB's Pune Regional Office. The region consists of 8 AAQMS, out of which 2 AAQMS installed at WIT Campus and Saat Rasta – Chitale Clinic recorded 100% of the observation days under the 'Satisfactory' category. The share of non-polluted days at AAQMS installed at Pune and Solapur were found to be 51.6% and 52% respectively, while around 43% and 47% of the observations recorded under the 'Moderate' category, and around 5% and 2% recorded under the 'Poor' category respectively. The share of non-polluted days in Bhosari, Nal Stop and Swargate was found to be 52.6%, 41% and 75.9% respectively, while the remaining observations were recorded under the 'Moderate' category in all 3 mentioned stations.

The Water Supply Plant AAQMS at Panvel (Raigad region) recorded around 96% of the observation days as non-polluted days as compared to 52.4% recorded under the same catgory in 2017-18; only around 4% observations came under the 'Moderate' category compared to 44.8% in the year 2017-18, thereby indicating an improvement in the air quality in that area. The percentage of non-polluted days in Kopri and Naupada was found to be around 83% and 58% respectively, while around 47% observations recorded at Balkum/Glaxo were found to be under the 'Satisfactory' category. The percenatge share of observation days under the 'Moderate' category was found to have decreased across all 3 stations in the Thane region.

Conclusion

Air pollution is a modern-day problem, a by-product of heavy industrialization and urbanization. In the quest for developing our economy, we are bringing down the quality of the very air we breathe. Today, ambient air pollution is one of the top risk factors causing millions of deaths worldwide while harming our environment. It is thus necessary to continuously monitor air quality and take decisions on preventive measures that can lead to sustainable development. MPCB continuously monitors the level of air pollutants for determining the air quality. The purpose of systematic air quality monitoring through a network of AAQMS is to identify the trends of pollutants in specific areas that can result in adverse impacts on human health and the surrounding environment. Monitoring of the air quality helps policy/decision makers to implement pollutant-specific strategies in the concerned areas for controlling/lowering the pollution problems associated with those pollutants.

SO_2 is a strong, colourless gas which is a by-product of the burning of fossil fuels from industrial activities and vehicular emissions. In 2018-19, all 72 AAQMS installed in the Maharashtra region recorded SO_2 concentrations which were found to be under the prescribed annual standard value of 50 µg/m^3. It is worth mentioning that all 10 AAQMS from the Kalyan region having a presence of industrial establishments (Dombivali and Ambernath MIDC) recorded SO_2 concentrations in the range of 20-33 µg/m^3, compared to 36-73 µg/m^3 recorded in 2017-18. Similar trends were observed in the Navi Mumbai region, where Airoli AAQMS recorded a drop in the annual SO_2 levels from 58 µg/m^3 in 2017-18 to 31 µg/m^3 in 2018-19. The rest of the AAQMS from the same region recorded levels within the range of 18-19 µg/m^3. All the regions were relatively clean with regard to SO_2 in 2018-19.

Anthropogenic activities like direct and indirect agricultural emissions and industrial emissions like combustion of fossil fuels and biomass lead to NOx emissions. High concentrations affect human health and also affect the environment by playing a major role in the processes of acidification and eutrophication. Sustainable climate-smart agricultural practices and the promotion and use of renewable energy alternatives are required to curb NOx pollution. Out of the 12 regions which recorded NOx levels, 6 regions, namely Mumbai, Kalyan, Pune, Raigad, Navi Mumbai and Thane recorded high levels. Mumbai, one of the most densely packed megacities, recorded the highest NOx concentrations at the AAQMS installed at Sion (83 µg/m^3) and Bandra (66 µg/m^3). In the Thane region, out of 3 stations, 2 stations - Kopri and Naupada - both recorded high NOx concentrations of about 49 µg/m^3, while the station installed at Balkum recorded 31 µg/m^3, which falls within the limit. Levels of NOx were found to be within the limits (40 µg/m^3) in cities of Amravati, Aurangabad, Chandrapur, Nashik, and Nagpur.

The RSPM levels were found to be exceeding the standard limit of 60 µg/m^3; this was observed in all regions except for 4 AAQMS from the Navi Mumbai region, namely, Mahape – MPCB - Nirmal Bhavan (53 µg/m^3), Rabale (54 µg/m^3), Kharghar - CIDCO Nodal Office (57 µg/m^3) and Taloja – MIDC Building (58 µg/m^3), where the levels were slightly lower than the limit. The AAQMS at Shivaji University Campus – Kolhapur, DY Patil Campus, Navi Mumbai and Panvel - Water Supply Plant (Raigad) recorded annual average levels of 60 µg/m^3, which is the exact standard limit value. The trend of high RSPM was predominantly observed in Chandrapur, Mumbai and Kalyan regions, primarily due to the presence of industrial settlements and an increased rate of urbanization. Chandrapur especially has power plants, cement manufacturing units and a well-established mining

sector (coal mines), which has led to the region having one of the highest levels of RSPM in the state for the past few years. Appropriate operation and maintenance practices at mines and quarry sites, and strict norms for the construction sector should be regulated to minimize the dispersion of RSPM into the air.

Carbon Monoxide (CO), is a colourless, odourless, toxic air pollutant which is the result of the incomplete combustion of carbon containing fuels such as natural gas, gasoline, coal and wood. The emissions from vehicles are a major source of CO. Breathing air with high CO concentration may lead to reduced O_2 transport by haemoglobin, and may result in dizziness, fatigue, nausea and headache. It was observed that the CO levels had exceeded the standard limit, especially in the post-monsoon months (October to February), mainly in the regions of Bandra, Nagpur, Pune and Solapur. Effective steps are necessary to curb the problem of CO emission. The Government must prepare and implement effective traffic management plans to avoid vehicular congestion, and a better public transport network must be in place for citizens. Adoption of green transport system such as e-vehicles would greatly reduce CO emissions, for which the government must create the necessary infrastructure for establishing eco-friendly and green systems. The public also needs to make some efforts to improve this situation. They can contribute by regulary servicing their vehicles and using public transport whenever possible. Ground Level Ozone is a secondary pollutant which is formed when 2 primary pollutants (NOx and VOCs) react in sunlight and stagnant air. It may result in a variety of health problems, especially for children, elder people and patients with lung diseases such as Asthma[16]. In 2018-19, CAAQMS installed in Nashik, Solapur, Aurangabad, Chandrapur and Nagpur exceeded the standard limit value for Ozone (100µg/m^3), especially in months of October to December and April to May. The Government must implement control strategies[17] which may include:

1. Cleaner burning gasoline formulated to reduce VOC, NOx and other pollutants;
2. Strict NOx emission limits for power plants and industrial combustion sources;
3. Enhanced vehicle inspection programs; and
4. Strict limitations on the solvent usage in factories.

In the case of Benzene, both Nagpur and Dombivali AAQMS recorded high Benzene concentrations for 7 consecutive months (October to April and September to March respectively), which were above the standard limit, while in Chandrapur, the levels were found to be over the limit especially during winter and summer months. On the other hand, Aurangabad, Bandra, Civil Lines – Chandrapur and Pune AAQMS recorded Benzene levels well within the limits throughout the year.

[16] https://www.epa.gov/ground-level-ozone-pollution
[17] https://www3.epa.gov/region1/airquality/strategy.html

Data recorded by AAQMS across Maharashtra 2018-19

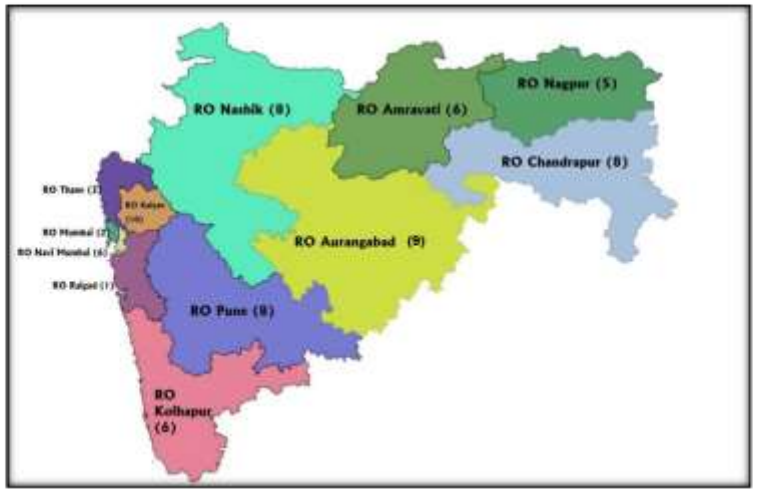
Thane
- Kopri
- Naupada
- Balkum/Glaxo

Nashik
- Old B. J. Market
- Girna Water Tank
- MIDC Jalgaon
- RTO Colony
- MIDC Satpur - VIP
- NMC Nashik
- SRO Office Nashik
- Nashik CAAQMS

Amravati
- LRT Commerce College
- MIDC Water Works - Akola
- Akola- College of Engg & Technology
- Raj Kamal Chowk
- Govt. College of Engineering
- Godhadiwala Private Limited

Nagpur
- IOE North Ambazari road
- MIDC Office, Hingna Road
- Govt Polytechnic Col, Sadar
- Civil lines Nagpur
- Nagpur CAAQMS

Chandrapur
- Ghuggus
- Chandrapur - MIDC
- Chandrapur - SRO MPCB
- Tadali MIDC
- Ballarshah
- Rajura
- Chandrapur CAAQMS
- Civil Lines , Chandrapur



Kalyan
- Ambernath
- Badlapur - BIWA House
- I.G.M. Hospital
- Prematai hall
- Dombivali
- MIDC Office Dombivali
- Dombivali CAAQMS
- MPCB RO Kalyan office
- Smt. CHM College Campus
- Powai Chowk

Aurangabad
- SBES College
- Collector Office, Aurangabad
- C.A.D.A. Office
- Aurangabad CAAQMS
- Jalna- Bachat Bhavan
- Jalna- Krishnadhan seeds Ltd
- MIDC Water Works - Latur
- Shyam Nagar-Kshewraj Vidyalaya
- Ganj Golai - Sidhheshwar Bank

Mumbai
- Bandra
- Sion

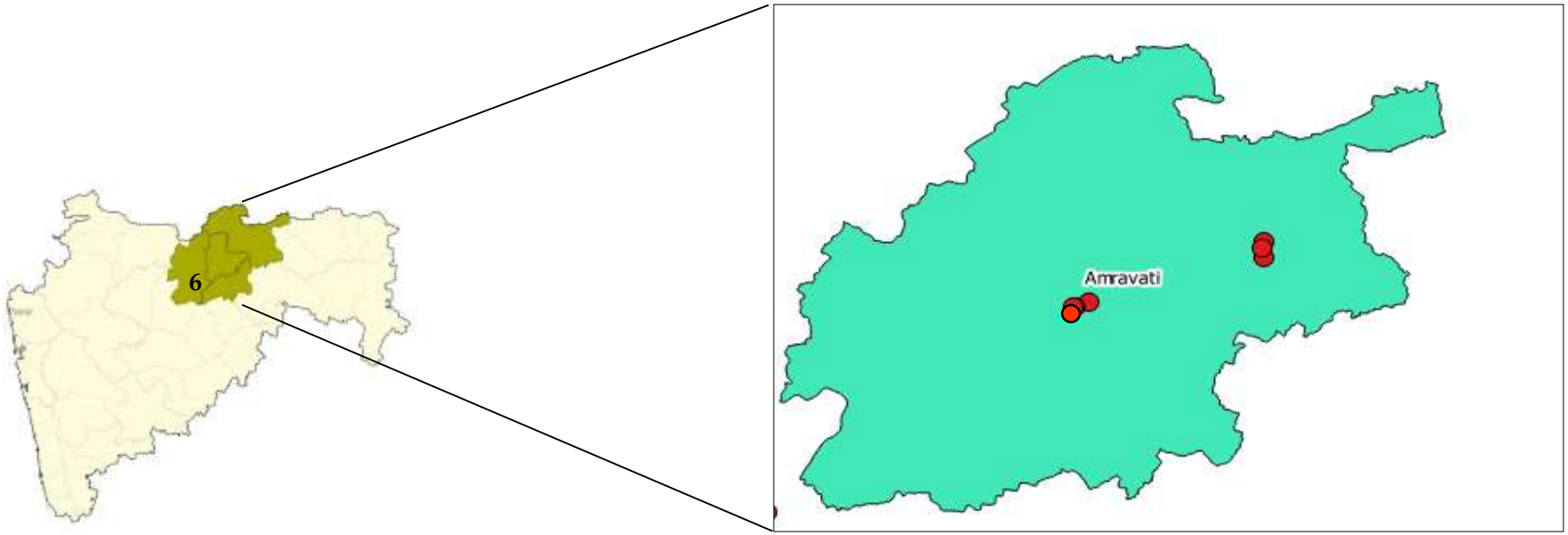
Navi Mumbai
- Rabale
- Nerul - DY Patil
- Mahape, MPCB-Nirmal Bhavan
- Airoli
- Kharghar - CIDCO Nodal Office
- Taloja - MIDC Building

Raigad
- Panvel- Water Supply Plant

Kolhapur
- Shivaji University Campus
- Ruikar Trust
- Mahadwar Road
- Terrace of SRO-Sangli, Udyog Bhavan
- Sangli-Miraj Primary Municipal school
- Krishna Valley school

Pune
- Bhosari
- Nal Stop
- Swargate, Pune
- Pimpri-Chinchwad - BOB Building
- Karve Road - CAAQMS
- WIT Campus
- Saat Rasta- Chithale Clinic
- Solapur

RO – Amravati



MPCB RO	No.	Region	Station code	Station name	Type	Latitude (deg)	Longitude (deg)
Amravati	1	Akola	700	LRT Commerce College	Residential	20° 41' 01.2" N	77° 02' 43.5" E
	2	Akola	701	MIDC Water Works - Akola	Industrial	20° 41' 12.1" N	77° 02' 20.1" E
	3	Akola	702	Akola- College of Engg & Technology	Commercial	20° 42' 16.6" N	77° 05' 35.9" E
	4	Amravati	547	Raj Kamal Chowk	Rural and other areas	20° 55' 42.4" N	77° 45' 14.2" E
	5	Amravati	548	Govt. College of Engineering	Residential	20° 57' 14.8" N	77° 45' 35.3" E
	6	Amravati	549	Godhadiwala Private Limited	Industrial	20° 53' 20.9" N	77° 45' 32.0" E

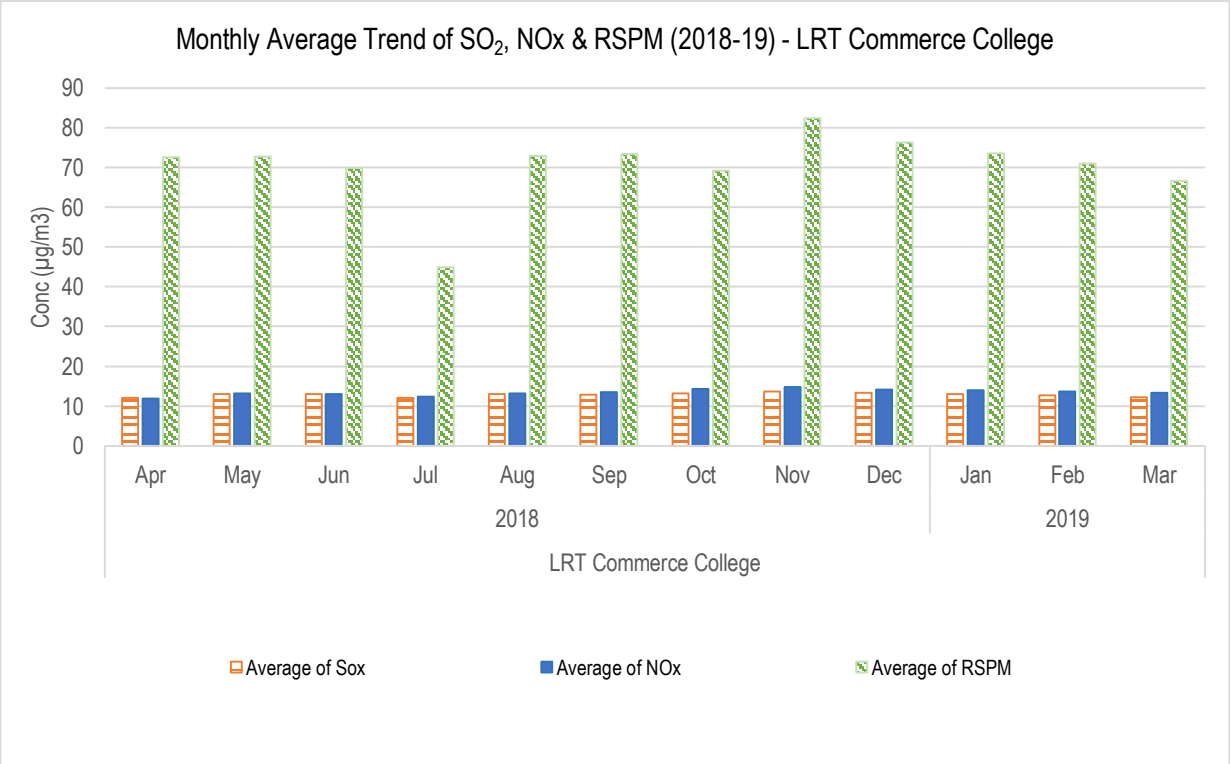
Akola – LRT Commerce College

Table No. 8: Data for Monthly average reading recorded at LRT Commerce College, Akola

Station Name	Year	Month	Average of SO_2 (µg/m³)	Average of NOx (µg/m³)	Average of RSPM(µg/m³)
LRT Commerce College	2018	Apr	12	12	73
		May	13	13	73
		Jun	13	13	70
		Jul	12	12	45
		Aug	13	13	73
		Sep	13	13	73
		Oct	13	14	69
		Nov	14	15	82
		Dec	13	14	76
	2019	Jan	13	14	74
		Feb	13	14	71
		Mar	12	13	67

Note: Monthly graphs do not have any CPCB Standard[18].

Figure No. 18: Monthly average reading recorded at LRT Commerce College, Akola



[18] https://cpcb.nic.in/air-quality-standard/

Table No. 9: Data for Annual average trend of SO_2, NOx, and RSPM at LRT Commerce College, Akola

Station Name	Year	Average of SO2 (µg/m³)	Average of NO_X (µg/m³)	Average of RSPM(µg/m³)
Annual Permissible Limits (CPCB)		*50*	*40*	*60*
LRT Commerce College	09-10	6	2	87
	10-11	6	3	107
	11-12	7	7	125
	12-13	8	8	126
	13-14	7	3	122
	14-15	7	3	117
	15-16	7	7	115
	16-17	8	9	109
	17-18	9	10	107
	18-19	13	14	72

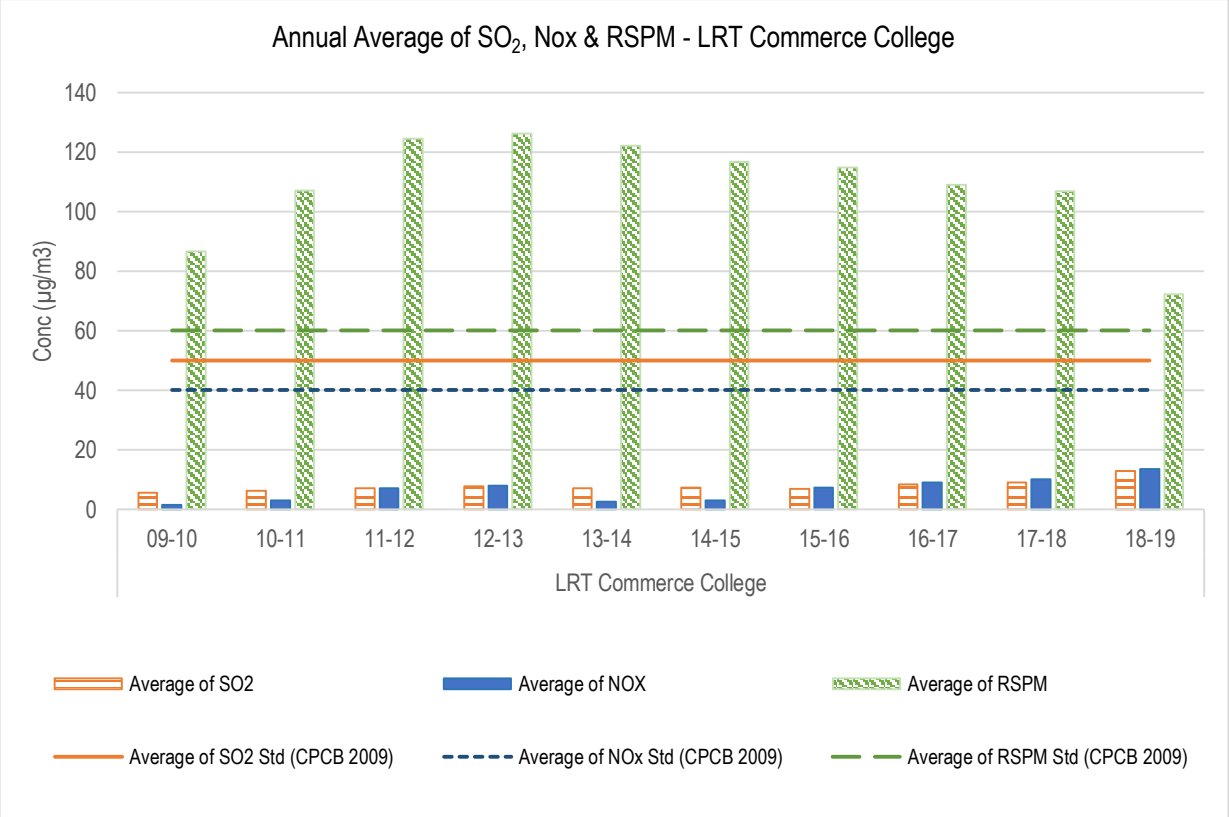


Figure No. 19: Annual average trend of SO2, NOx, and RSPM at LRT Commerce College, Akola

Akola -MIDC Water Works

Table No. 10: Data for Monthly average reading recorded at MIDC Water works, Akola

Station Name	Year	Month	Average of SO_2(µg/m³)	Average of NOx(µg/m³)	Average of RSPM(µg/m³)
MIDC Water Works - Akola	2018	Apr	15	14	88
		May	15	15	85
		Jun	15	15	71
		Jul	15	15	68
		Aug	17	16	79
		Sep	16	17	80
		Oct	18	20	76
		Nov	18	20	83
		Dec	17	20	82
	2019	Jan	15	17	79
		Feb	15	16	78
		Mar	15	16	76

Note: Monthly graphs do not have any CPCB Standard[19].

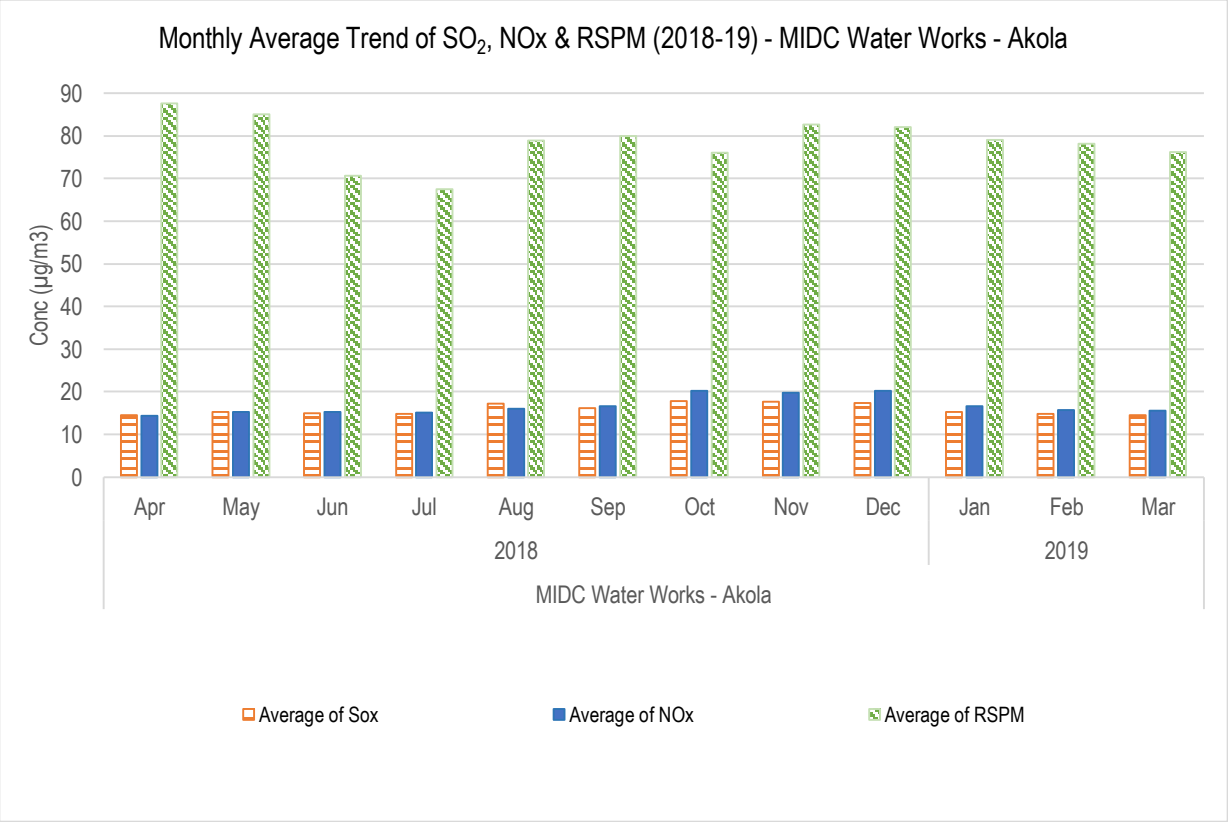


Figure No. 20: Monthly average reading recorded at MIDC Water works, Akola

[19] https://cpcb.nic.in/air-quality-standard/

Table No. 11: Data for Annual average trend of SO_2, NOx, and RSPM at MIDC Water works, Akola

Station Name	Year	Average of SO_2(µg/m³)	Average of NOX(µg/m³)	Average of RSPM(µg/m³)
Annual Permissible Limits (CPCB)		*50*	*40*	*60*
MIDC Water Works - Akola	09-10	8	10	88
	10-11	9	7	131
	11-12	10	11	141
	12-13	10	11	142
	13-14	9	7	136
	14-15	9	9	129
	15-16	7	12	106
	16-17	9	10	128
	17-18	11	11	116
	18-19	16	17	79

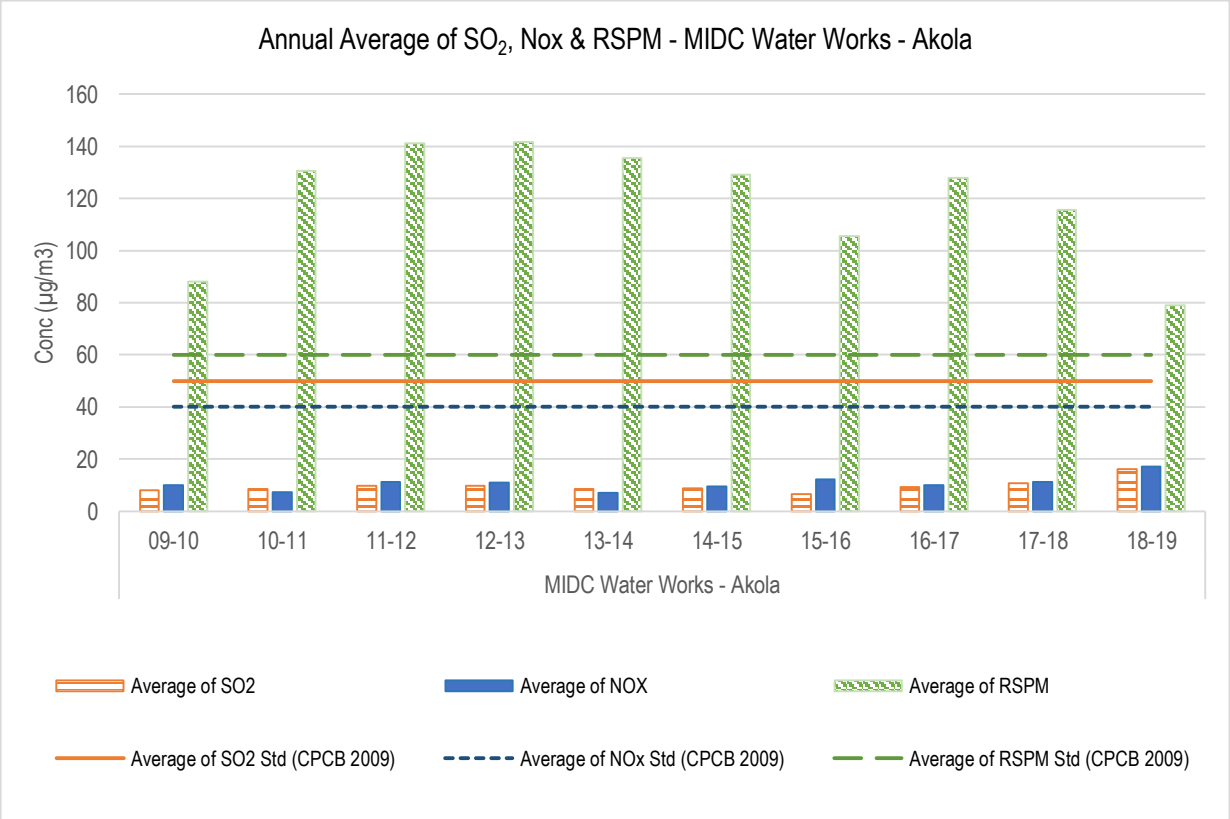


Figure No. 21: Annual average trend of SO_2, NOx, and RSPM at MIDC Water works.-Akola

Akola - College of Engg & Technology

Table No. 12: Data for Monthly average reading recorded at College of Engg & Technology Akola (Architecture Branch), Akola

Station Name	Year	Month	Average of SO2(µg/m³)	Average of NOx(µg/m³)	Average of RSPM(µg/m³)
Akola - College of Engg & Technology	2018	Apr	13	13	77
		May	13	14	75
		Jun	13	13	69
		Jul	13	13	66
		Aug	14	14	72
		Sep	14	15	75
		Oct	16	15	72
		Nov	16	15	84
		Dec	15	15	79
	2019	Jan	13	14	73
		Feb	13	14	69
		Mar	14	13	67

Note: Monthly graphs do not have any CPCB Standard[20].

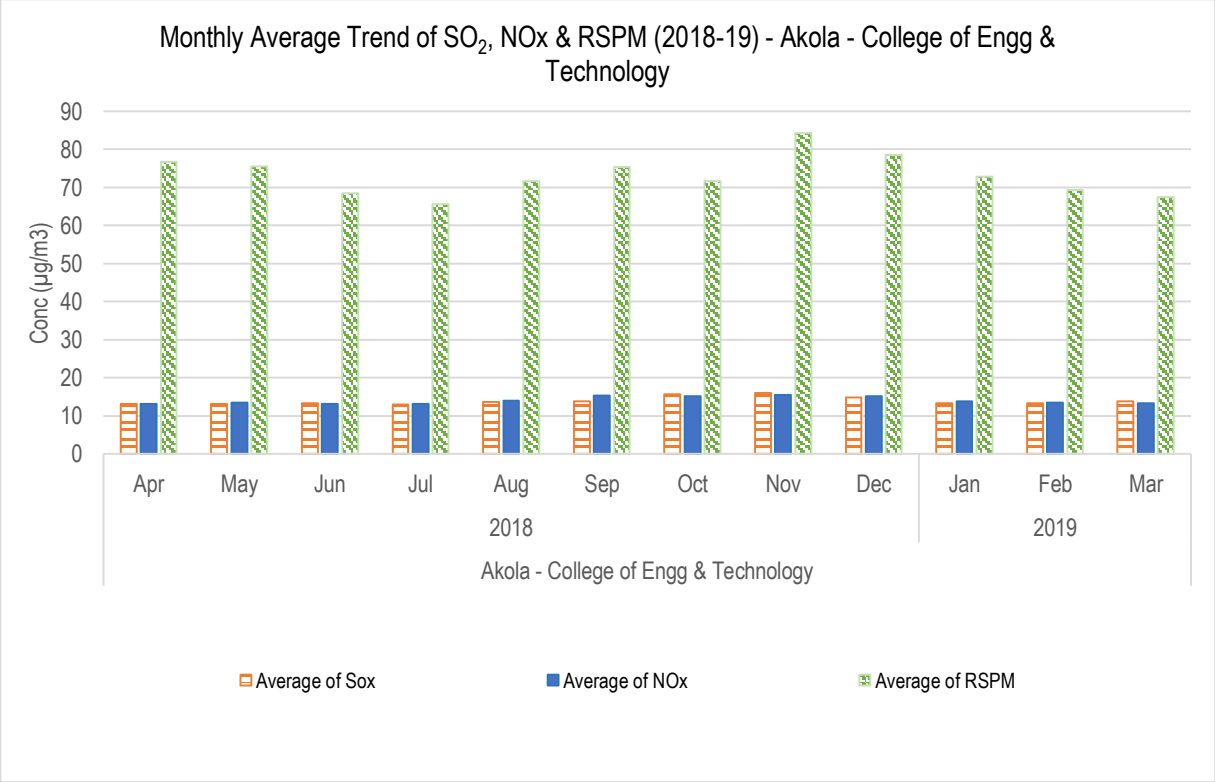


Figure No. 22: Monthly average reading recorded at College of Engg & Technology Akola (Architecture Branch), Akola

[20] https://cpcb.nic.in/air-quality-standard/

Table No. 13: Data for Annual average trend of SO_2, NOx, and RSPM at College of Engg & Technology Akola (Architecture Branch),Akola

Station Name	Year	Average of SO2(µg/m³)	Average of NOX(µg/m³)	Average of RSPM(µg/m³)
Annual Permissible Limits (CPCB)		*50*	*40*	*60*
Akola- College of Engg & Technology	09-10	6	2	117
	10-11	7	5	142
	11-12	9	9	150
	12-13	9	8	151
	13-14	8	6	149
	14-15	8	8	146
	15-16	8	9	139
	16-17	9	9	142
	17-18	9	10	111
	18-19	14	14	74

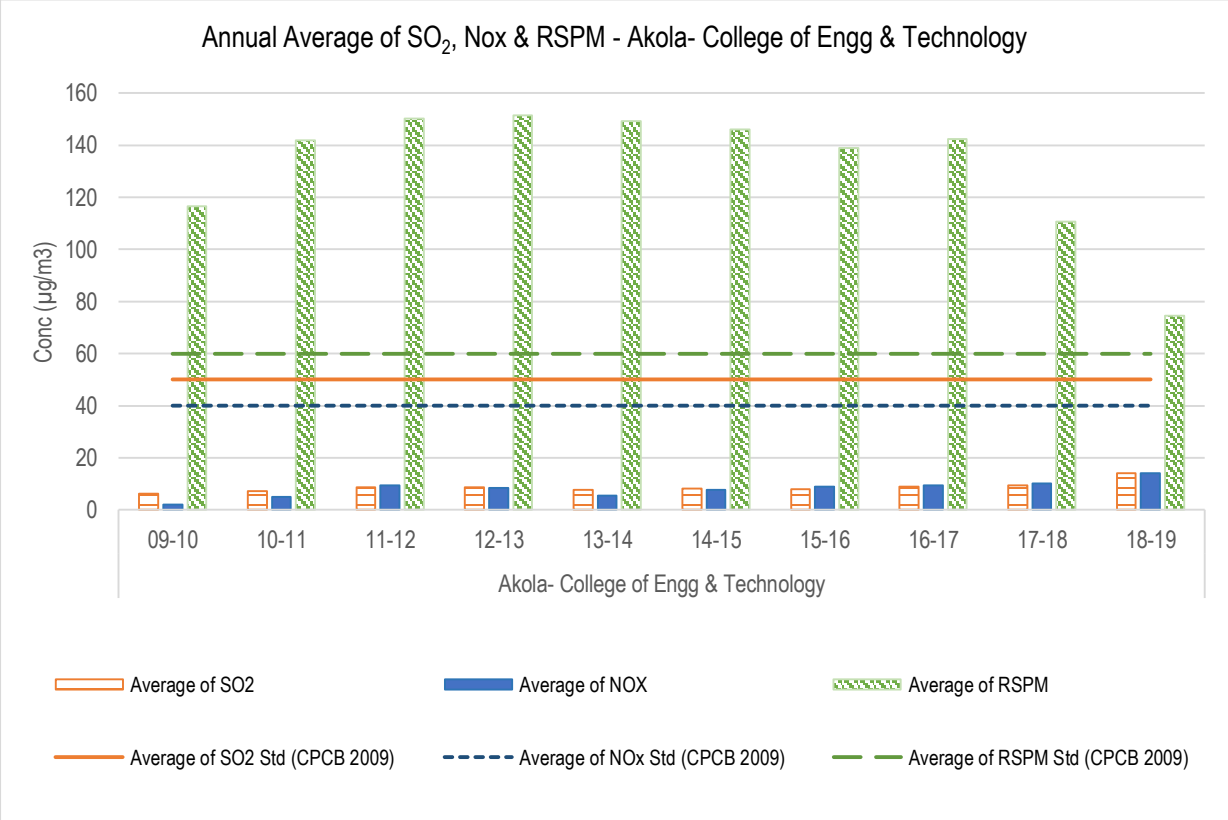


Figure No. 23: Annual average trend of SO_2, NOx, and RSPM at College of Engg & Technology Akola (Architecture Branch)-Akola

Amravati - Raj Kamal Chowk

Table No. 14: Data for Monthly average reading recorded at Raj Kamal Chowk. , Amravati

Station Name	Year	Month	Average of SO_2(µg/m³)	Average of NOx(µg/m³)	Average of RSPM(µg/m³)
Raj Kamal Chowk	2018	Apr	19	20	120
		May	19	20	127
		Jun	20	21	112
		Jul	17	18	110
		Aug	16	17	111
		Oct	18	20	118
		Nov	19	21	129
		Dec	18	19	119
	2019	Jan	18	19	124
		Feb	17	19	120
		Mar	15	16	122

Note: Monthly graphs do not have any CPCB Standard[21].

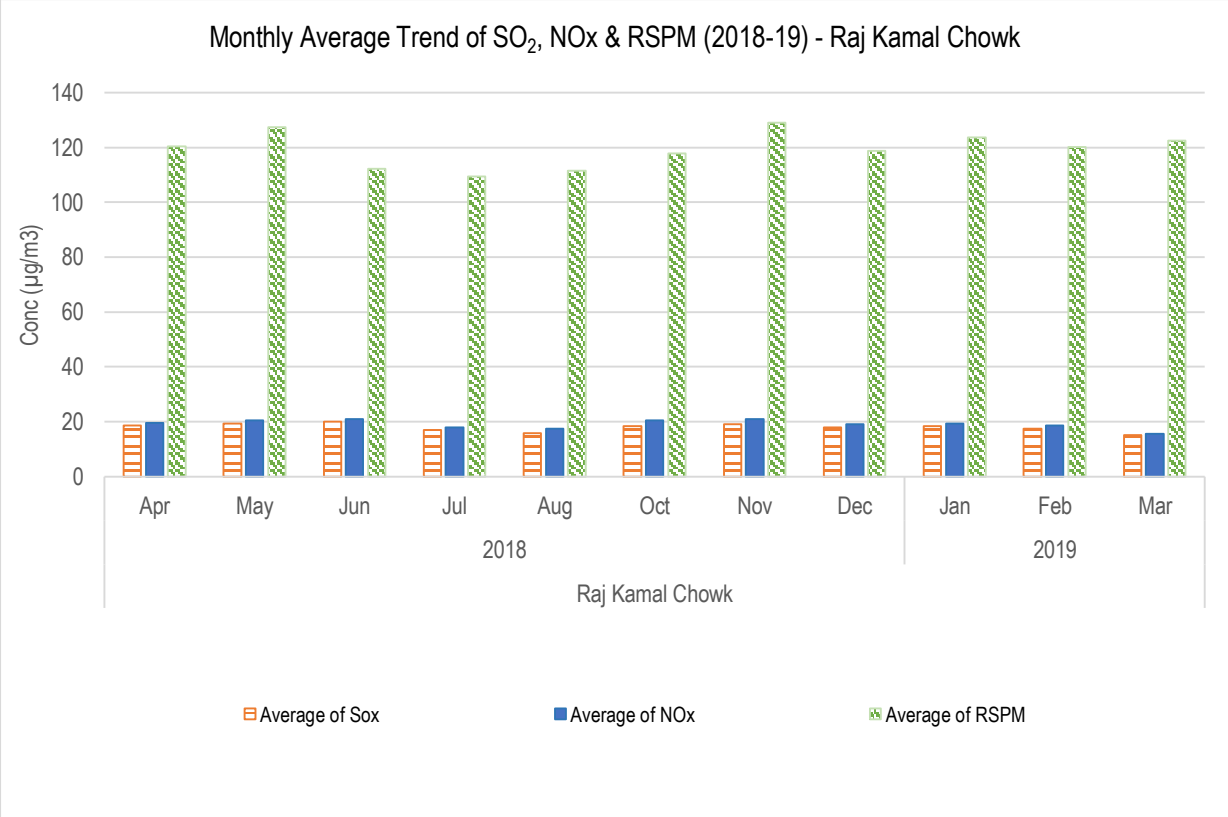


Figure No. 24: Monthly average reading recorded at Raj Kamal Chowk. , Amravati
Note: Data for the month of September is not available

[21] https://cpcb.nic.in/air-quality-standard/

Table No. 15: Data for Annual average trend of SO_2, NOx, and RSPM at Raj Kamal Chowk. ,Amravati

Station Name	Year	Average of SO_2(µg/m³)	Average of NOX(µg/m³)	Average of RSPM(µg/m³)
Annual Permissible Limits (CPCB)		*50*	*40*	*60*
Raj Kamal Chowk	06-07	13	19	79
	07-08	11	16	78
	08-09	12	15	100
	09-10	14	16	125
	10-11	13	15	146
	11-12	15	18	108
	12-13	12	13	109
	13-14	12	13	128
	14-15	12	14	133
	15-16	12	14	135
	16-17	13	14	141
	17-18	13	23	120
	18-19	18	19	119

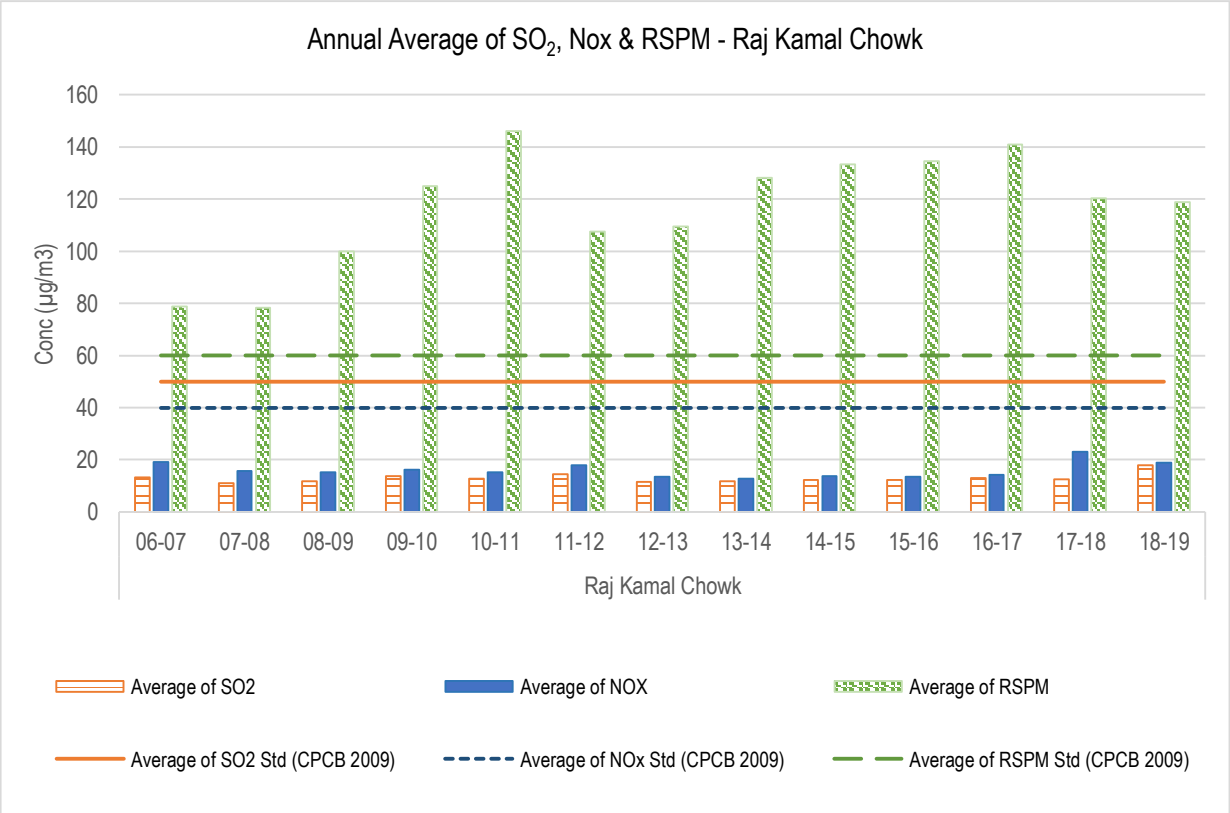


Figure No. 25: Annual average trend of SO_2, NOx, and RSPM at Raj Kamal Chowk. -Amravati

Amravati - Govt. college of Engineering

Table No. 16: Data for Monthly average reading recorded at Govt. college of Engineering , Amravati

Station Name	Year	Month	Average of SO_2(µg/m³)	Average of NOx(µg/m³)	Average of RSPM(µg/m³)
Govt. College of Engineering	2018	Apr	13	15	83
		May	17	20	90
		Jun	10	11	58
		Jul	16	16	74
		Aug	12	14	59
		Oct	16	17	76
		Nov	18	20	100
		Dec	14	15	72
	2019	Jan	14	15	68
		Feb	13	15	80
		Mar	14	15	81

Note: Monthly graphs do not have any CPCB Standard[22].

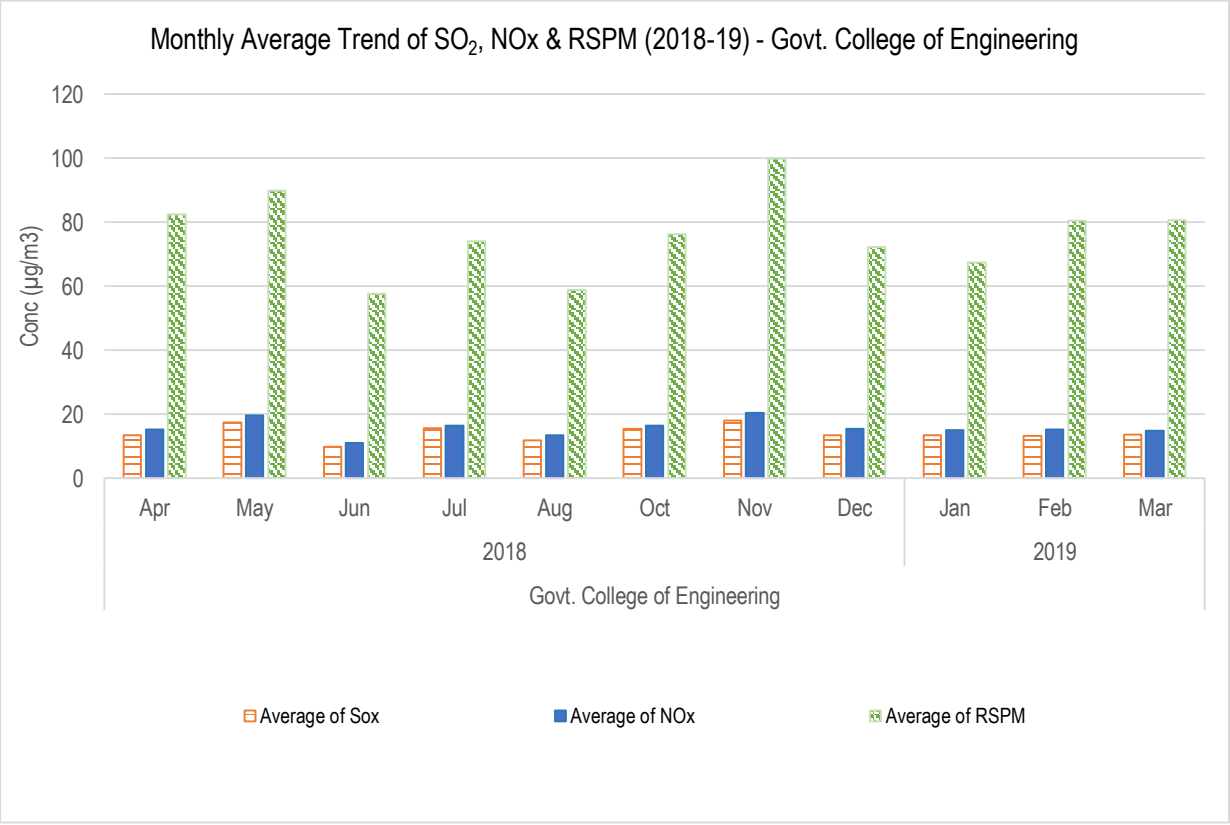


Figure No. 26: Monthly average reading recorded at Govt. college of Engineering – Amravati
Note: Data for the month of September is not available

[22] https://cpcb.nic.in/air-quality-standard/

Table No. 17: Data for Annual average trend of SO_2, NOx, and RSPM at Govt. college of Engineering - Amravati

Station Name	Year	Average of SO_2(µg/m³)	Average of NO_X(µg/m³)	Average of RSPM(µg/m³)
Annual Permissible Limit (CPCB)		*50*	*40*	*60*
Govt. College of Engineering	06-07	10	12	50
	07-08	8	8	40
	08-09	8	10	47
	09-10	10	12	78
	10-11	10	13	79
	11-12	10	12	79
	12-13	11	12	80
	13-14	10	12	80
	14-15	11	12	75
	15-16	11	12	73
	16-17	11	13	73
	17-18	11	16	69
	18-19	14	16	77

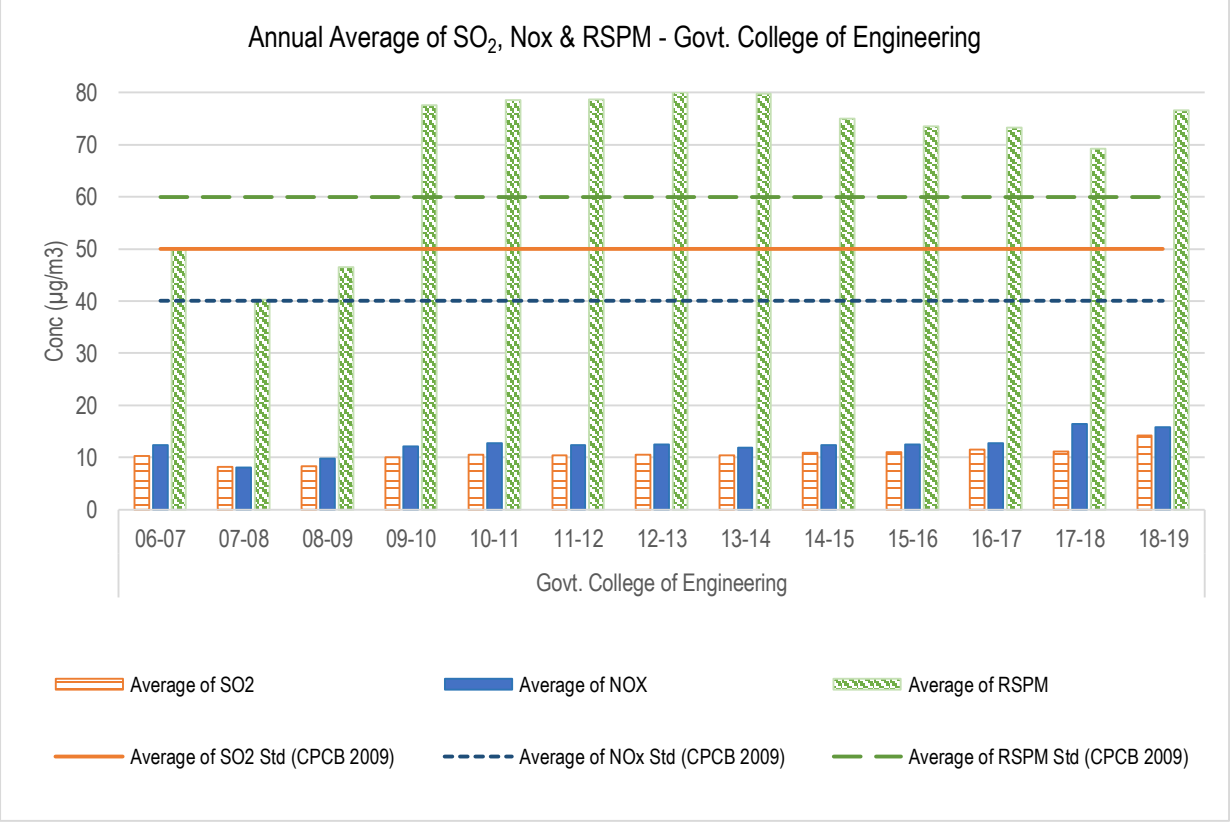


Figure No. 27: Annual average trend of SO_2, NOx, and RSPM at Govt. college of Engineering - Amravati

Amravati - Godhadiwala Private Limited

Table No. 18: Data for Monthly average reading recorded at Godhadiwala Private Limited - Amravati

Station Name	Year	Month	Average of SO_2(µg/m³)	Average of NOx(µg/m³)	Average of RSPM(µg/m³)
Godhadiwala Private Limited	2018	Apr	17	18	107
		May	16	17	114
		Jun	16	17	90
		Jul	13	14	90
		Aug	17	17	97
		Oct	17	18	112
		Nov	20	22	131
		Dec	16	17	112
	2019	Jan	15	16	115
		Feb	17	18	109
		Mar	14	15	120

Note: Monthly graphs do not have any CPCB Standard[23].

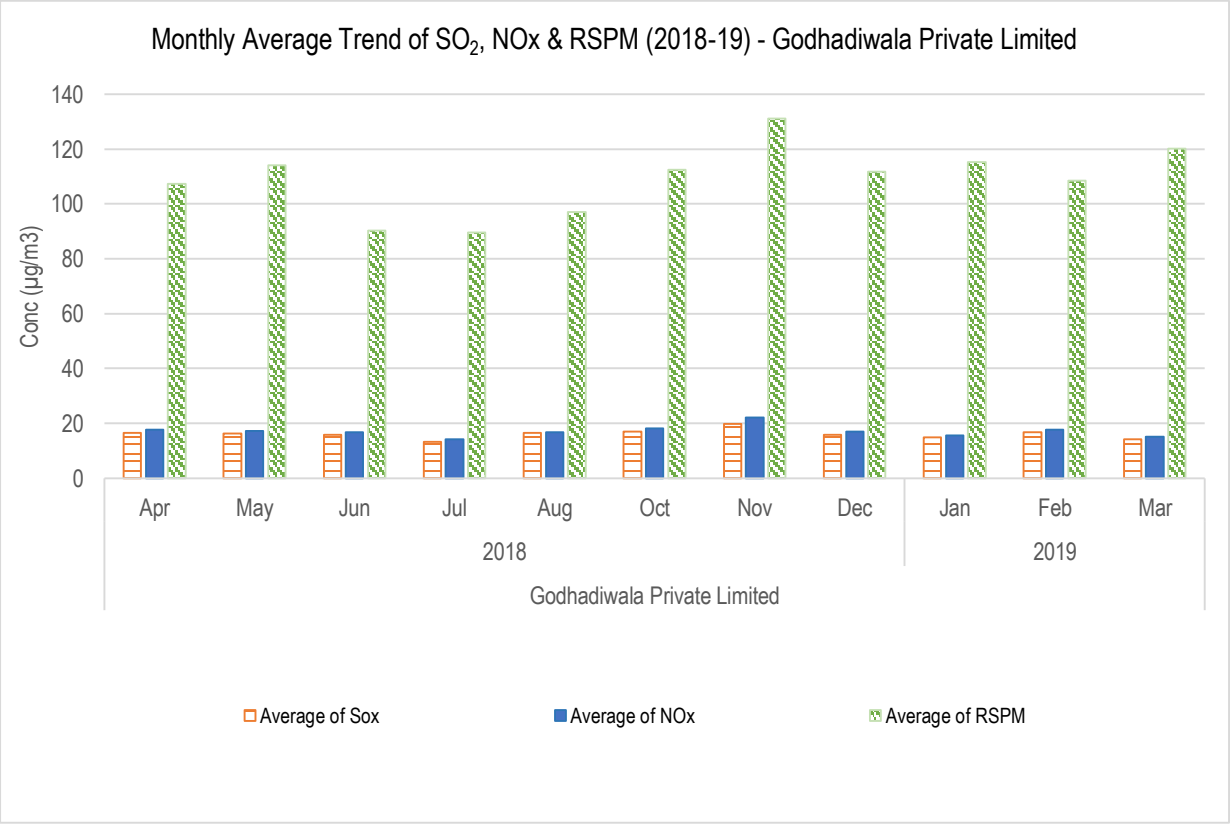


Figure No. 28: Monthly average reading recorded at Godhadiwala Private Limited – Amravati
Note: Data for the month of September is not available

[23] https://cpcb.nic.in/air-quality-standard/

Table No. 19: Data for Annual average trend of SO_2, NOx, and RSPM at Godhadiwala Private Limited - Amravati

Station Name	Year	Average of SO_2(µg/m³)	Average of NO_X(µg/m³)	Average of RSPM(µg/m³)
Annual Permissible Limit (CPCB)		*50*	*40*	*60*
Godhadiwala Private Limited	06-07	12	16	67
	07-08	9	12	58
	08-09	10	13	71
	09-10	12	14	102
	10-11	12	14	125
	11-12	11	13	100
	12-13	12	13	101
	13-14	11	12	94
	14-15	12	14	108
	15-16	11	13	110
	16-17	12	13	108
	17-18	11	21	97
	18-19	16	17	109

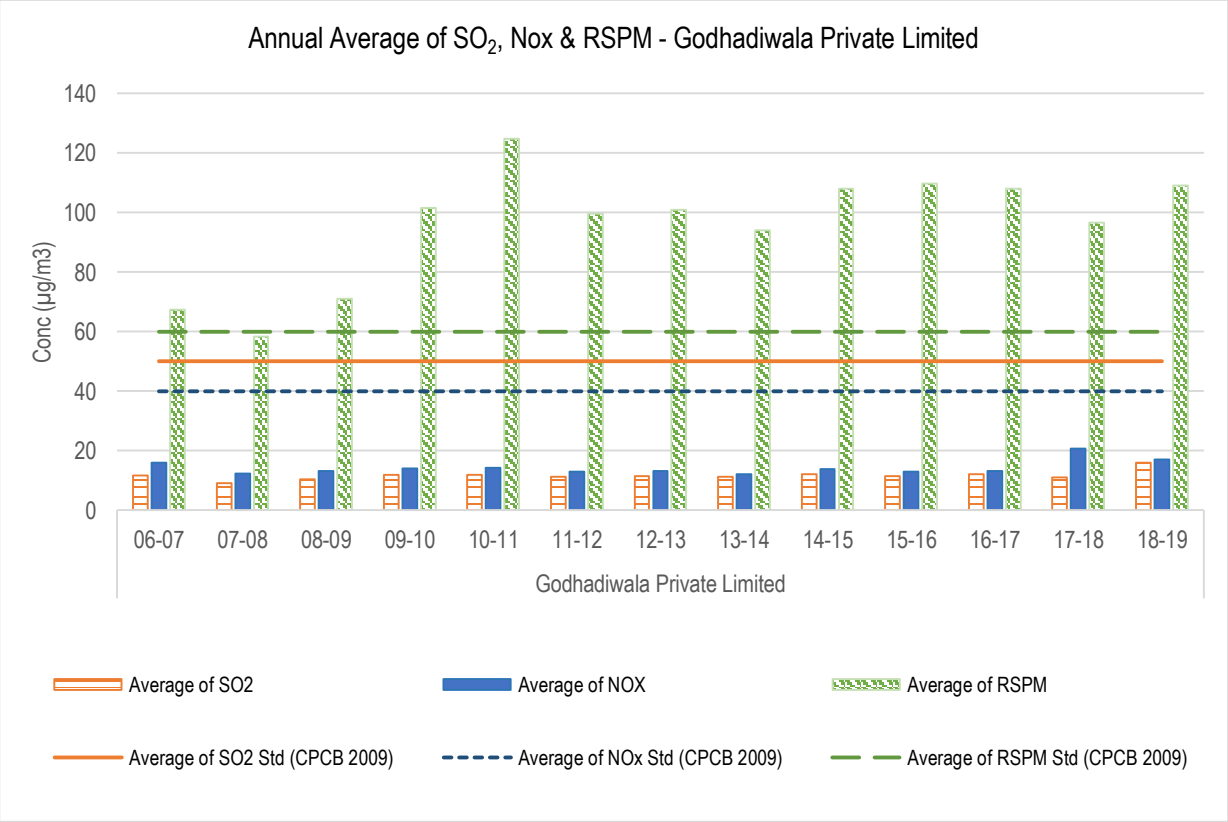
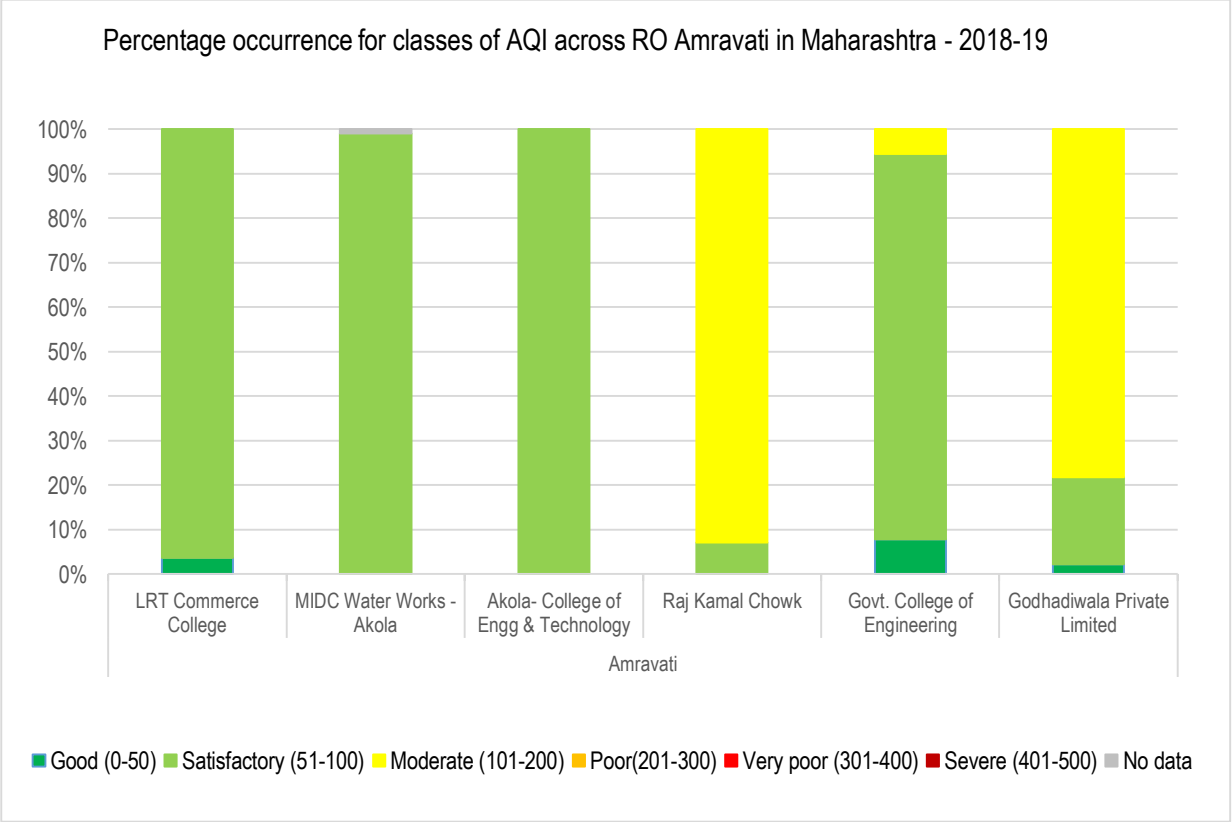


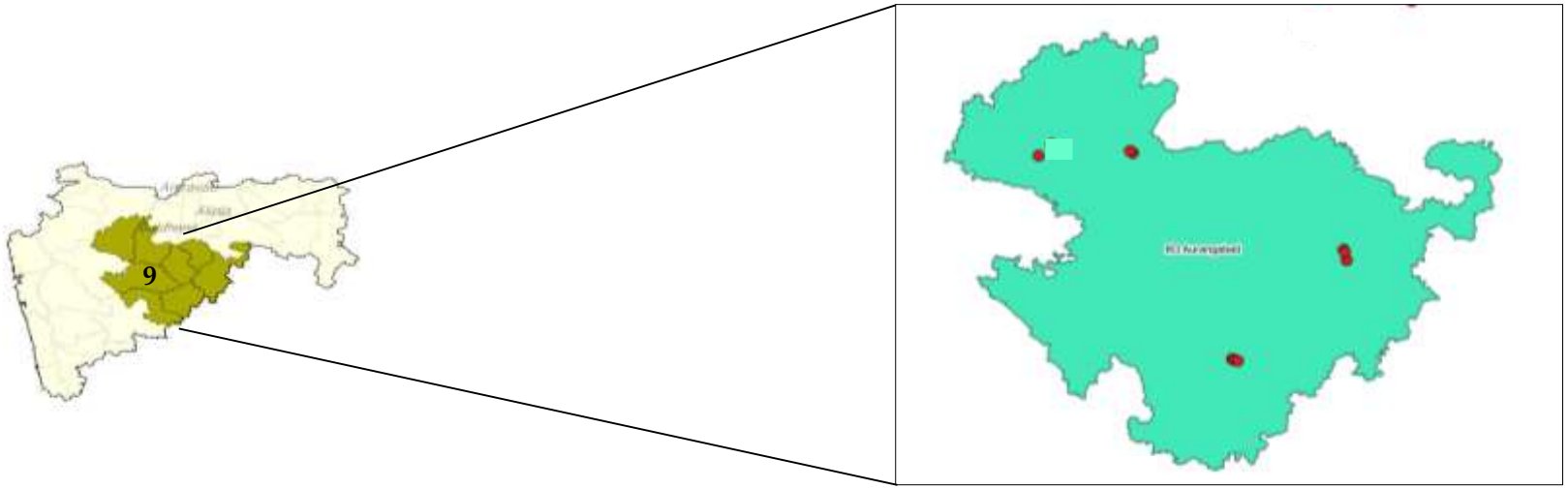
Figure No. 29: Annual average trend of SO_2, NOx, and RSPM at Godhadiwala Private Limited - Amravati

Table No. 20: Percentage exceedance of pollutants at Amravati RO

Station Name	Total Observations	Exceedence			% Exceedence		
		SO_2	NOx	RSPM	SO_2	NOx	RSPM
LRT Commerce College	108	0	0	103	0	0	95
MIDC Water Works - Akola	108	0	0	103	0	0	95
Akola- College of Engg & Technology	105	0	0	102	0	0	97
Raj Kamal Chowk	84	0	0	84	0	0	100
Govt. College of Engineering	89	0	0	74	0	0	83
Godhadiwala Private Limited	92	0	0	89	0	0	97



RO – Aurangabad



MPCB RO	Region	Station code	Station name	Type	Latitude (deg)	Longitude (deg)
Aurangabad	Aurangabad	511	SBES College	Residential	19° 52' 54.9" N	75° 19' 33.7" E
	Aurangabad	512	Collector Office, Aurangabad	Residential	19° 53' 58.4" N	75° 19' 14.2" E
	Aurangabad	513	C.A.D.A. Office	Residential	19° 52' 14.3" N	75° 21' 03.5" E
	Jalna	706	Jalna- Bachat Bhavan	Residential	19° 50' 26.4" N	75° 52' 17.4" E
	Jalna	707	Jalna- Krishnadhan seeds Ltd	Industrial	19° 51' 04.3" N	75° 51' 14.4" E
	Latur	641	MIDC Water Works - Latur	Industrial	18° 24' 53.0" N	76° 32' 49.4" E
	Latur	642	Shyam Nagar-Kshewraj Vidyalaya	Residential	18° 24' 21.6" N	76° 33' 50.2" E
	Latur	643	Ganj Golai - Sidhheshwar Bank	Rural and other areas	18° 23' 58.0" N	76° 35' 02.6" E
	Aurangabad		Aurangabad CAAQMS	Industrial	19° 48' 59.11"N	75° 14' 18.65"E

Aurangabad - SBES College

Table No. 21: Data for Monthly average reading recorded at SBES College, Aurangabad

Station Name	Year	Month	Average of SO_2(µg/m³)	Average of NOx(µg/m³)	Average of RSPM(µg/m³)
SBES College	2018	Apr	14	38	78
		May	15	38	76
		Jun	12	32	68
		Jul	10	27	57
		Aug	11	31	53
		Sep	13	33	57
		Oct	17	38	68
		Dec	21	47	68
	2019	Jan	22	52	71
		Feb	18	42	87
		Mar	14	35	81

Note: Monthly graphs do not have any CPCB Standard[24]

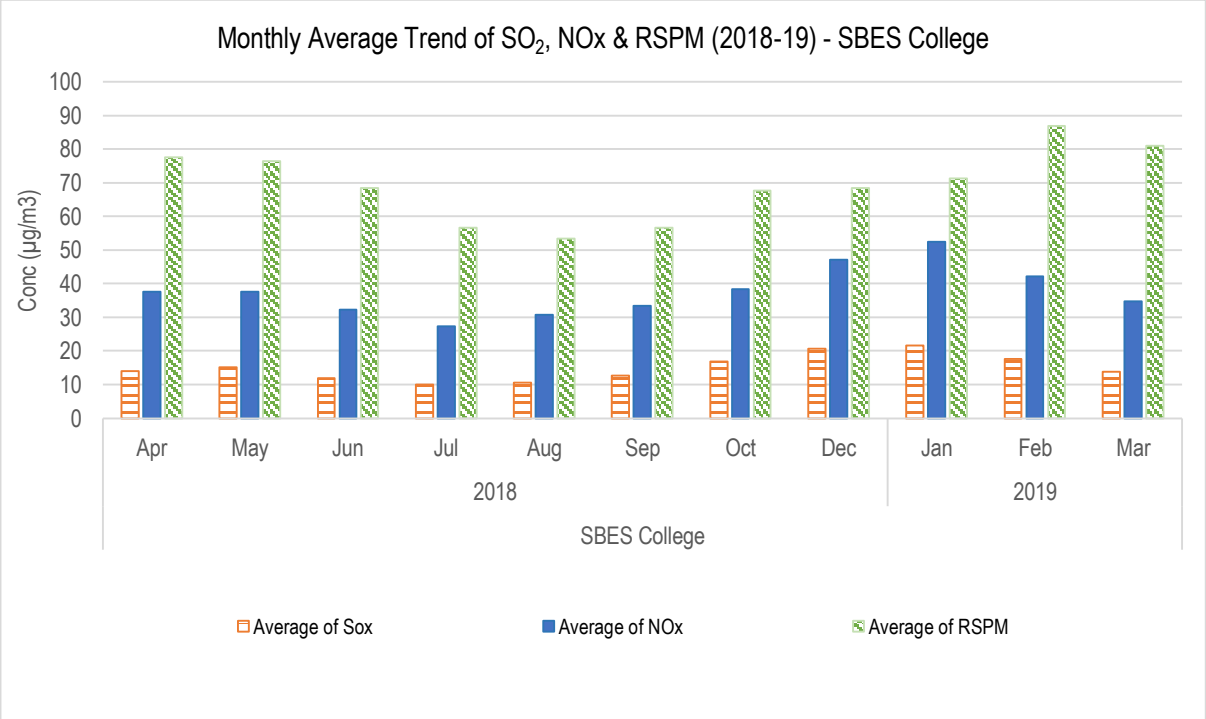


Figure No. 30: Monthly average reading recorded at SBES College – Aurangabad
Note: Data for the month of November is not available

[24] https://cpcb.nic.in/air-quality-standard/

Table No. 22: Data for Annual average trend of SO_2, NOx, and RSPM at SBES College - Aurangabad

Station Name	Year	Average of SO_2(µg/m³)	Average of NO_X(µg/m³)	Average of RSPM(µg/m³)
Annual Permissible Limit (CPCB)		*50*	*40*	*60*
SBES College	05-06	7	30	166
	06-07	6	18	85
	07-08	6	22	79
	08-09	9	22	94
	09-10	7	25	98
	10-11	7	23	94
	11-12	9	33	90
	12-13	10	33	93
	13-14	11	39	102
	14-15	13	43	97
	15-16	16	44	111
	16-17	14	41	108
	17-18	11	33	78
	18-19	15	38	70

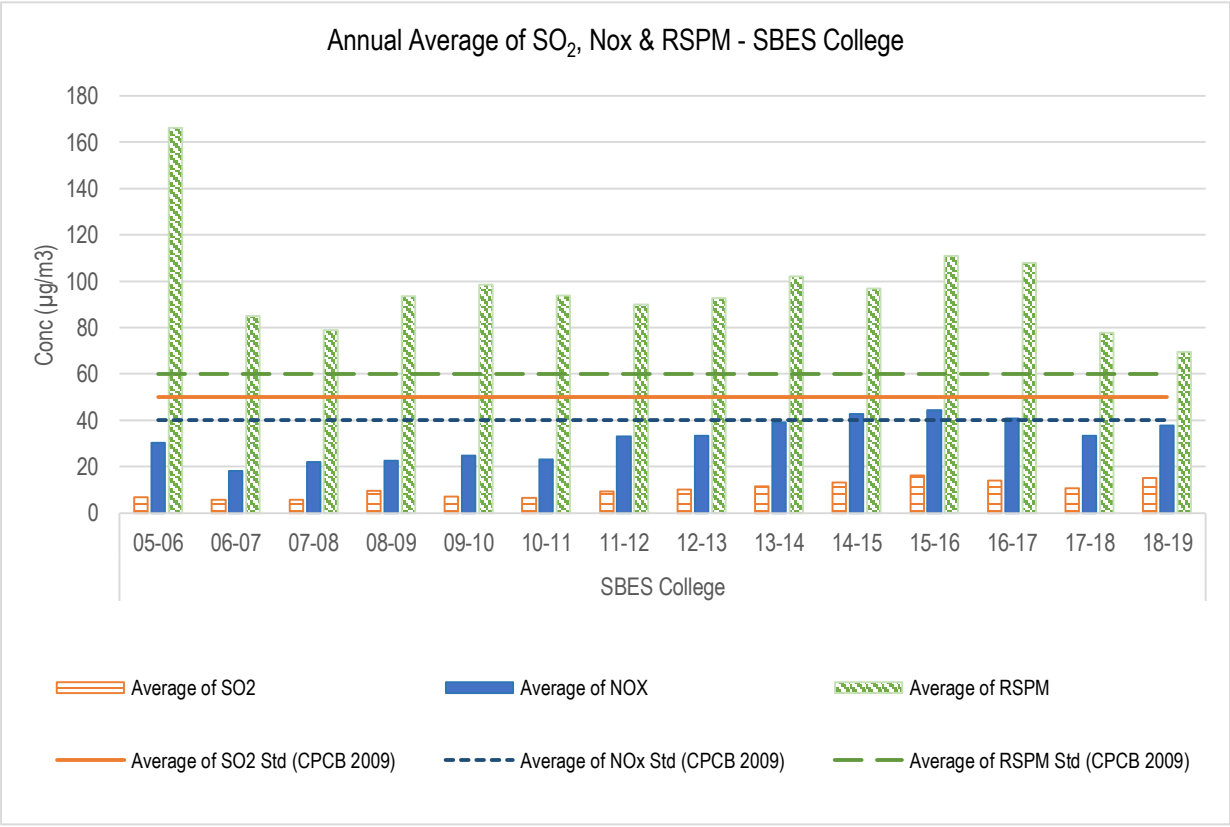


Figure No. 31: Annual average trend of SO_2, NOx, and RSPM at SBES College – Aurangabad

Aurangabad - Collector Office

Table No. 23: Data for Monthly average reading recorded at Collector Office, Aurangabad

Station Name	Year	Month	Average of SO_2(µg/m³)	Average of NOx(µg/m³)	Average of RSPM(µg/m³)
Collector Office, Aurangabad	2018	Apr	10	32	76
		May	11	31	76
		Jun	11	27	64
		Jul	9	24	48
		Aug	10	29	49
		Sep	10	30	47
		Oct	14	33	70

Note: Monthly graphs do not have any CPCB Standard[25]

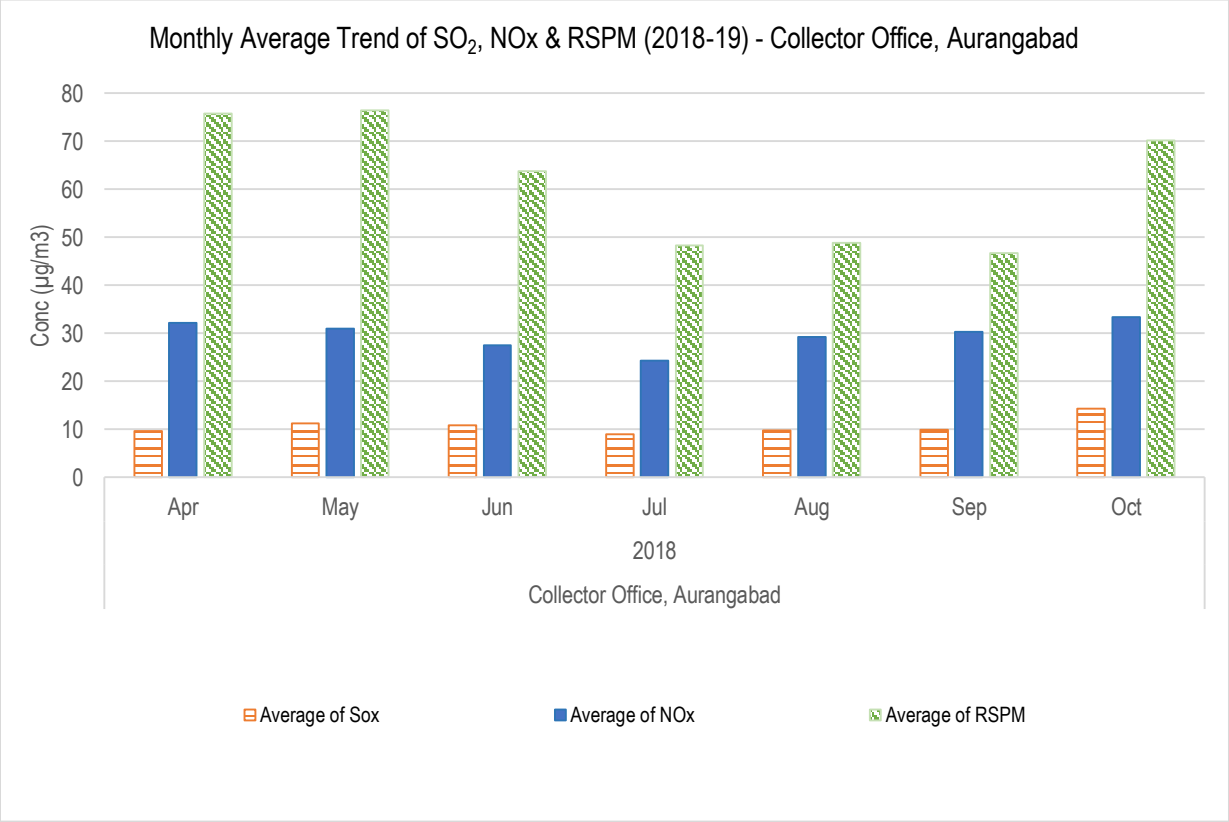


Figure No. 32: Monthly average reading recorded at Collector Office, Aurangabad
Note: Data for the month of November 2018 to March 2019 is not available

[25] https://cpcb.nic.in/air-quality-standard/

Table No. 24: Data for Annual average trend of SO_2, NOx, and RSPM at Collector Office, Aurangabad

Station Name	Year	Average of SO_2(µg/m³)	Average of NO_X(µg/m³)	Average of RSPM(µg/m³)
Annual Permissible Limit (CPCB)		*50*	*40*	*60*
Collector Office, Aurangabad	05-06	6	19	108
	06-07	4	13	73
	07-08	5	16	56
	08-09	8	20	68
	09-10	6	22	85
	10-11	6	22	69
	11-12	8	29	92
	12-13	9	31	76
	13-14	9	36	79
	14-15	10	34	78
	15-16	12	35	73
	16-17	11	33	88
	17-18	9	30	74
	18-19	11	30	63

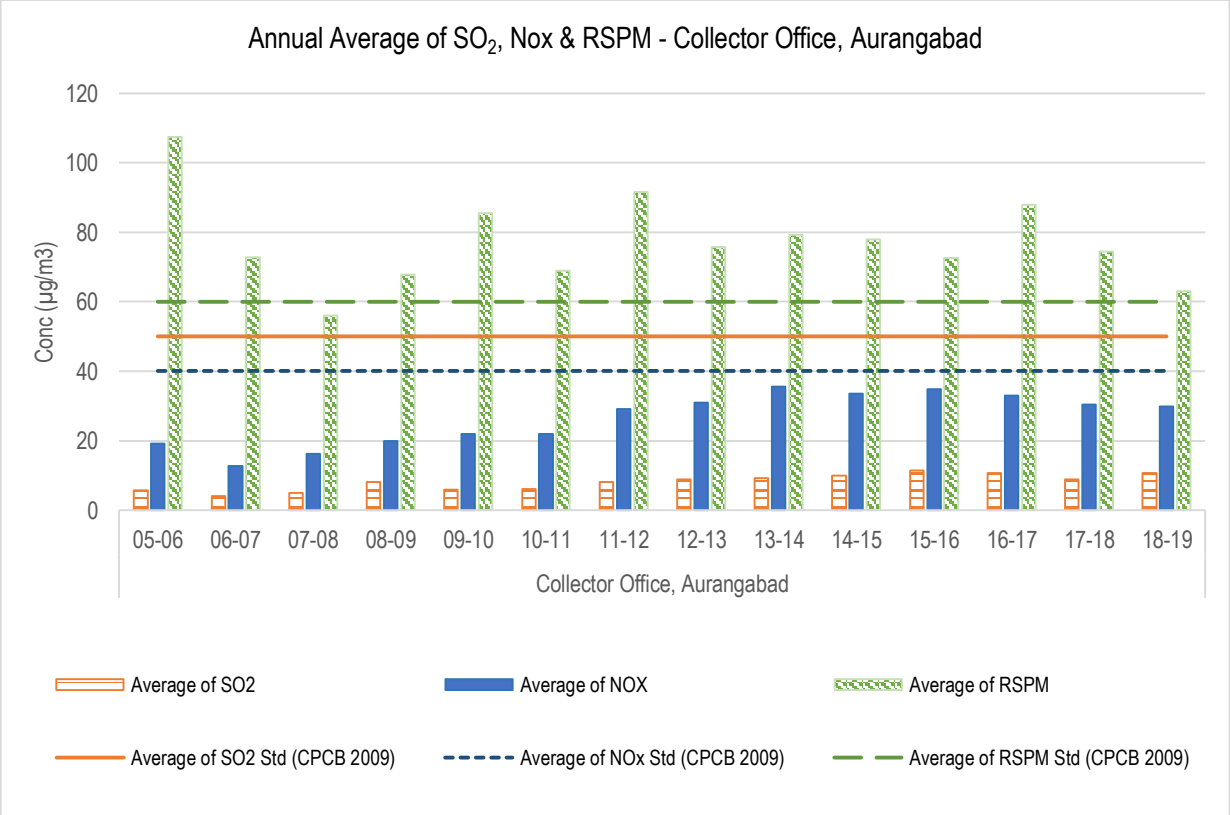


Figure No. 33: Annual average trend of SO_2, NOx, and RSPM at Collector Office, Aurangabad

Aurangabad - C.A.D.A. Office

Table No. 25: Data for Monthly average reading recorded at C.A.D.A. Office , Aurangabad

Station Name	Year	Month	Average of SO_2(µg/m³)	Average of NOx(µg/m³)	Average of RSPM(µg/m³)
C.A.D.A. Office	2018	Apr	12	35	77
		May	13	33	78
		Jun	11	31	61
		Jul	10	26	43
		Aug	11	30	51
		Sep	12	31	55
		Oct	15	36	74
		Dec	19	44	69
	2019	Jan	20	49	76
		Feb	17	39	87
		Mar	14	35	92

Note: Monthly graphs do not have any CPCB Standard[26]

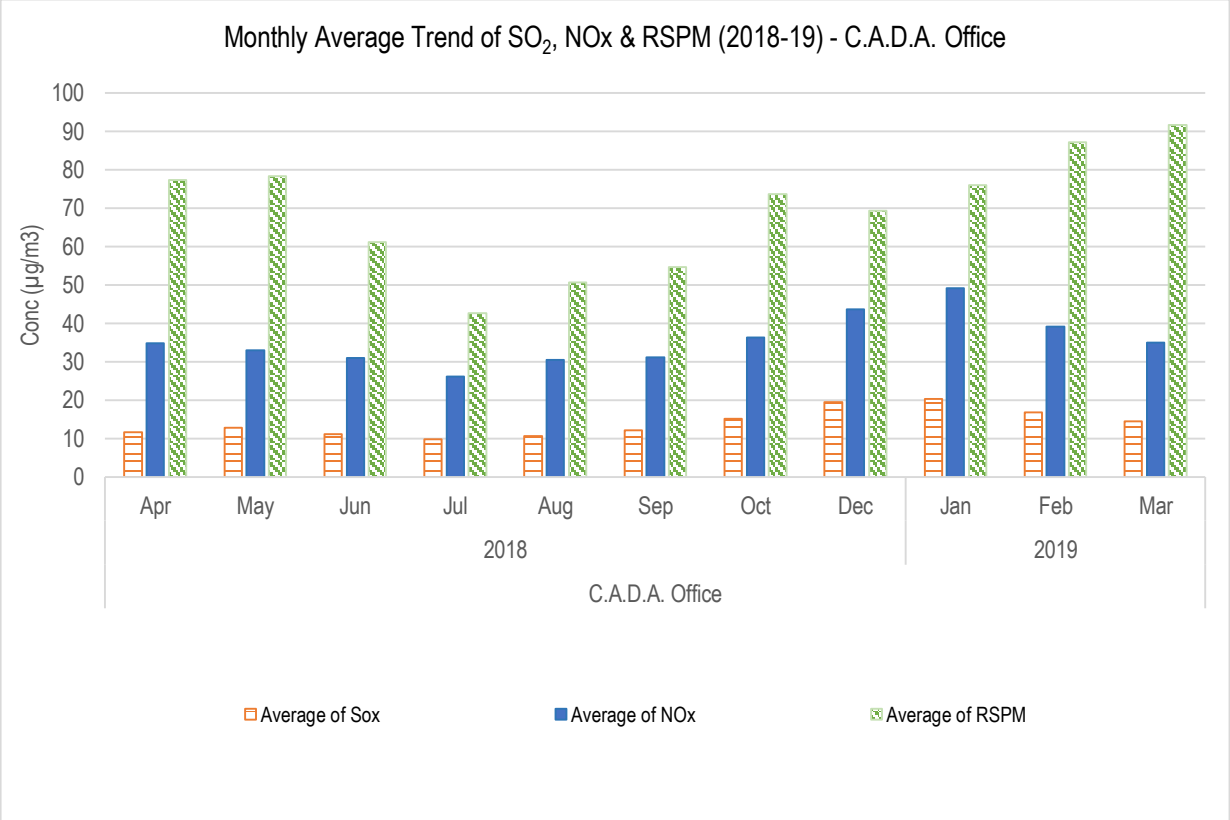


Figure No. 34: Monthly average reading recorded at C.A.D.A. Office – Aurangabad
Note: Data for the month of November is not available

[26] https://cpcb.nic.in/air-quality-standard/

Table No. 26: Data for Annual average trend of SO_2, NOx, and RSPM at C.A.D.A. Office , Aurangabad

Station Name	Year	Average of SO_2(µg/m³)	Average of NO_X(µg/m³)	Average of RSPM(µg/m³)
Annual Permissible Limit (CPCB)		*50*	*40*	*60*
C.A.D.A. Office	05-06	7	23	119
	06-07	5	19	79
	07-08	5	23	79
	08-09	9	21	63
	09-10	6	22	66
	10-11	6	22	69
	11-12	10	34	75
	12-13	11	35	68
	13-14	10	38	74
	14-15	12	40	79
	15-16	15	43	75
	16-17	13	39	82
	17-18	9	31	76
	18-19	14	36	69

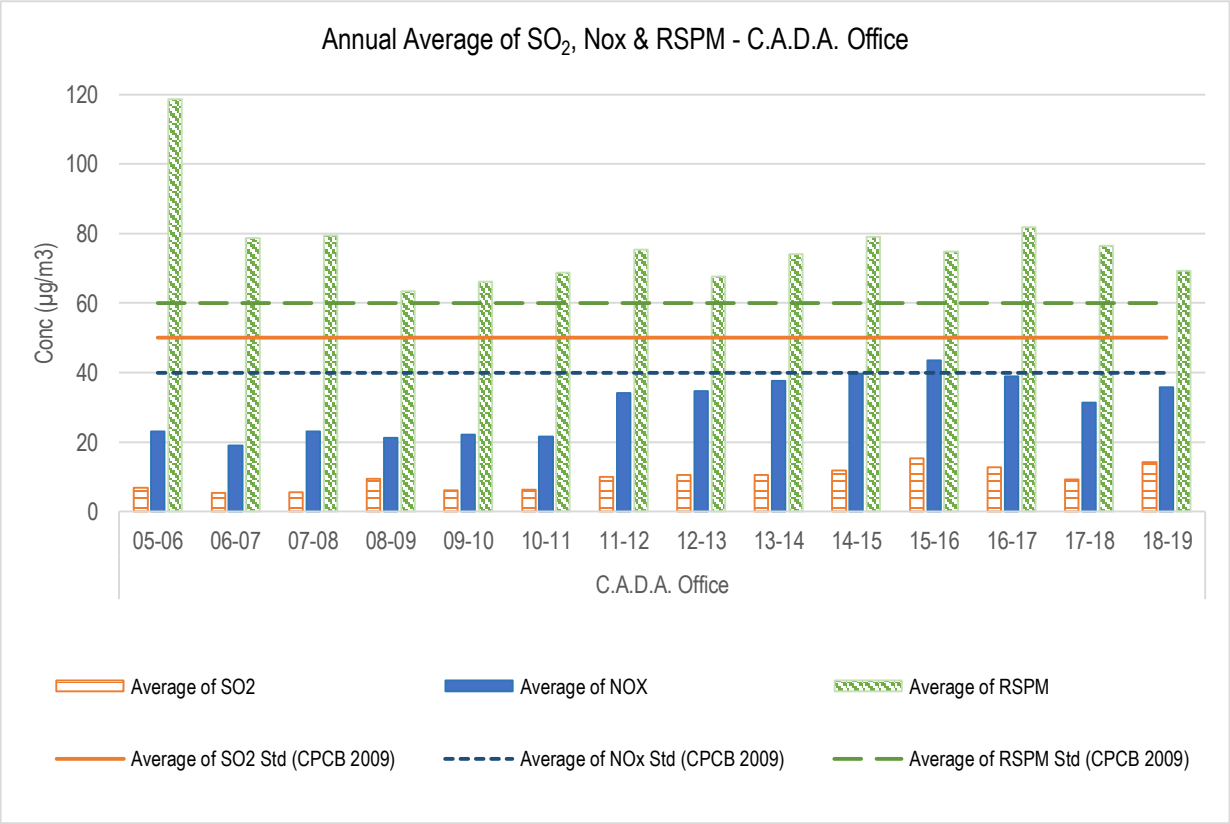


Figure No. 35: Annual average trend of SO_2, NOx, and RSPM at C.A.D.A. Office – Aurangabad

Jalna - Bachat Bhavan

Table No. 27: Data for Monthly average reading recorded at Jalna - Bachat Bhavan

Station Name	Year	Month	Average of SO_2(µg/m³)	Average of NOx(µg/m³)	Average of RSPM(µg/m³)
Jalna- Bachat Bhavan	2018	Apr	11	47	111
		May	11	44	112
		Jun	10	43	99
		Jul	12	41	98
		Aug	10	34	101
		Sep	10	35	105
		Oct	10	36	104
		Nov	10	39	104
		Dec	11	40	106
	2019	Jan	11	43	107
		Feb	10	44	104
		Mar	10	38	101

Note: Monthly graphs do not have any CPCB Standard[27]

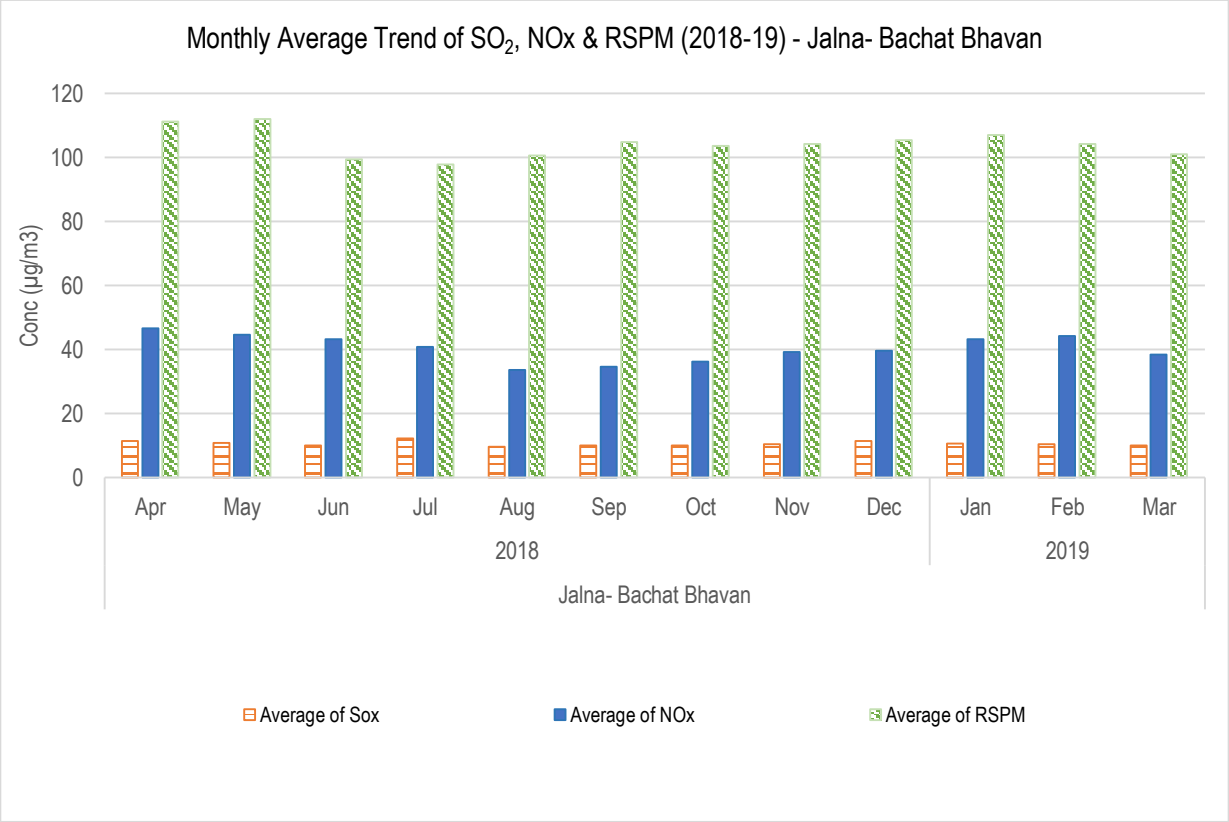


Figure No. 36: Monthly average reading recorded at Jalna-Bachat Bhavan

[27] https://cpcb.nic.in/air-quality-standard/

Table No. 28: Data for Annual average trend of SO_2, NOx, and RSPM at Jalna-Bachat Bhavan

Station Name	Year	Average of SO_2(µg/m³)	Average of NO_X(µg/m³)	Average of RSPM(µg/m³)
Annual Permissible Limit (CPCB)		*50*	*40*	*60*
Jalna- Bachat Bhavan	06-07	13	22	53
	07-08	17	28	87
	08-09	17	32	66
	09-10	5	28	84
	10-11	5	26	73
	11-12	6	25	89
	12-13	10	30	97
	13-14	10	30	100
	14-15	9	29	94
	15-16	11	29	111
	16-17	10	33	128
	17-18	9	40	110
	18-19	10	40	104

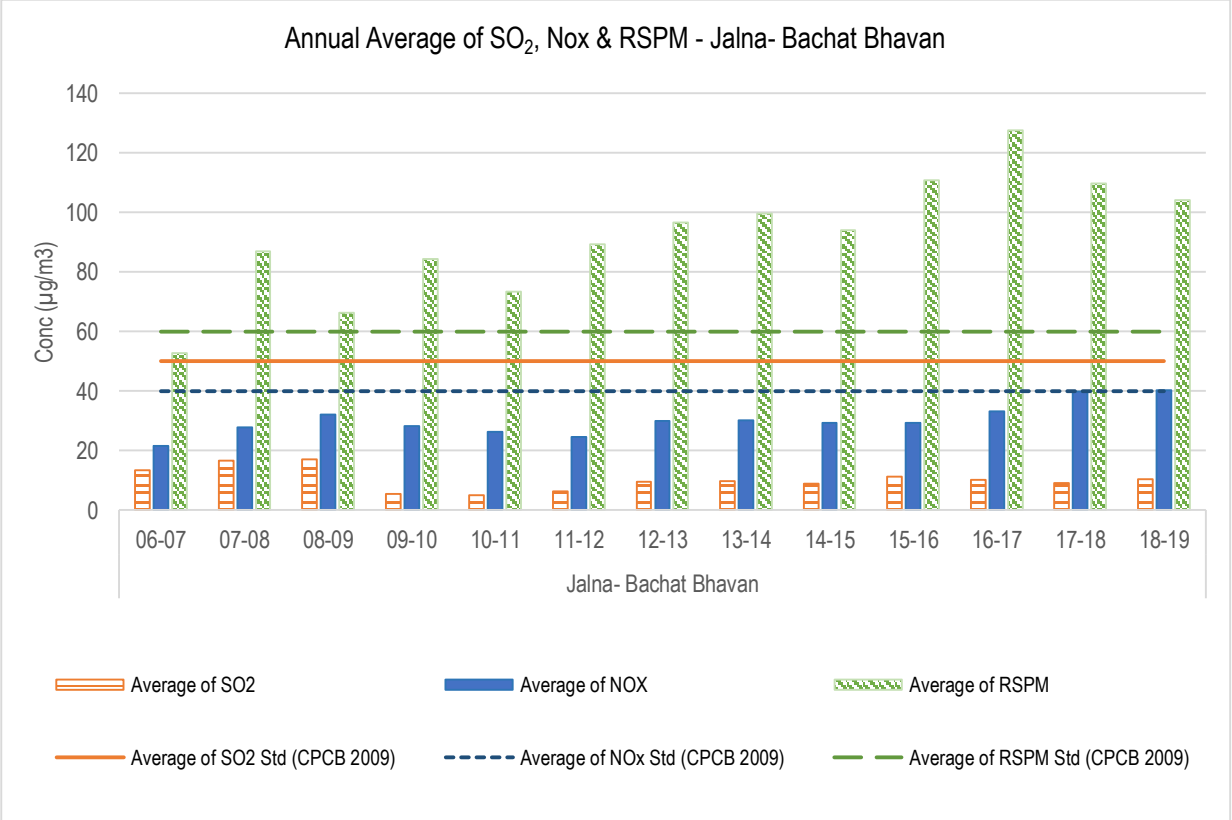


Figure No. 37: Annual average trend of SO_2, NOx, and RSPM at Jalna-Bachat Bhavan

Jalna - Krishnadhan Seeds Ltd.

Table No. 29: Data for Monthly average reading recorded at Jalna-Krishnadhan Seeds Ltd.

Station Name	Year	Month	Average of SO_2(µg/m³)	Average of NOx(µg/m³)	Average of RSPM(µg/m³)
Jalna- Krishnadhan seeds Ltd	2018	Apr	12	51	96
		May	11	46	97
		Jun	11	44	97
		Jul	11	40	98
		Aug	9	34	100
		Sep	10	35	102
		Oct	10	38	98
		Nov	10	38	98
		Dec	11	44	97
	2019	Jan	10	44	97
		Feb	11	45	96
		Mar	14	41	93

Note: Monthly graphs do not have any CPCB Standard[28]

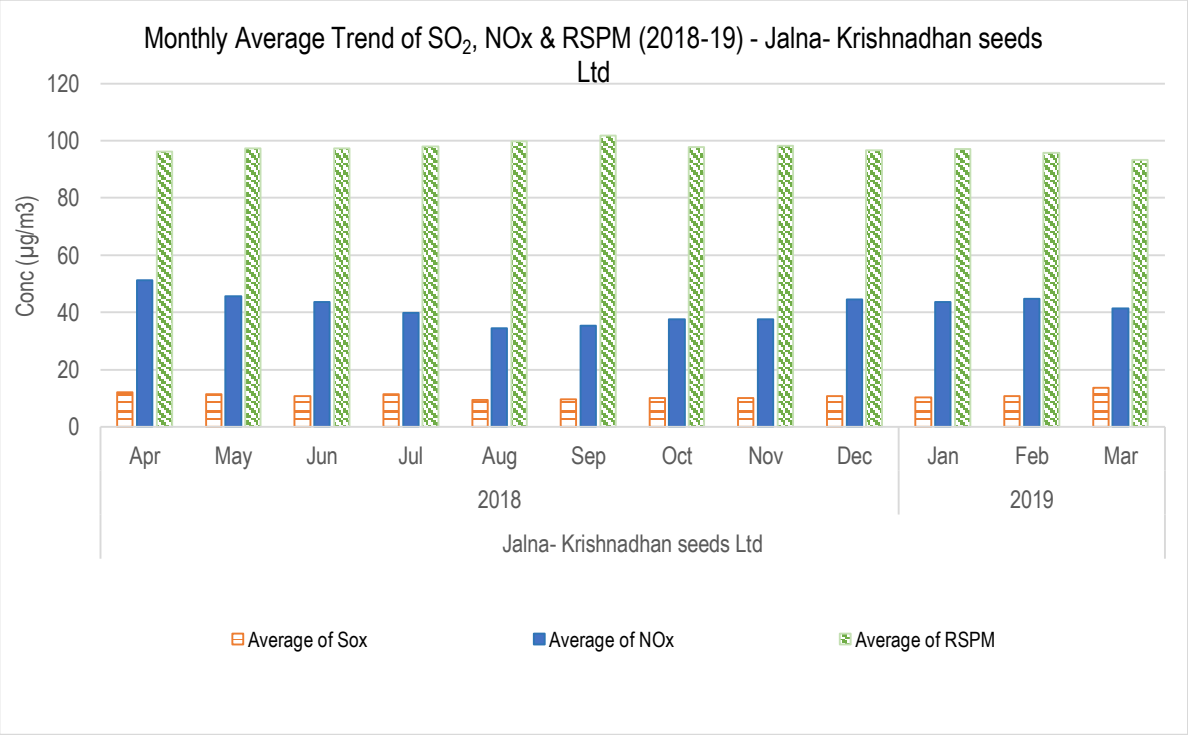


Figure No. 38: Monthly average reading recorded at Jalna-Krishnadhan Seeds Ltd.

[28] https://cpcb.nic.in/air-quality-standard/

Table No. 30: Data for Annual average trend of SO_2, NOx, and RSPM at Jalna - Krishnadhan Seeds Ltd.

Station Name	Year	Average of SO_2(µg/m³)	Average of NO_X(µg/m³)	Average of RSPM(µg/m³)
Annual Permissible Limit (CPCB)		***50***	***40***	***60***
Jalna- Krishnadhan seeds Ltd	06-07	17	29	125
	07-08	28	44	140
	08-09	30	45	182
	09-10	13	37	111
	10-11	7	33	139
	11-12	8	26	140
	12-13	11	32	143
	13-14	11	31	150
	14-15	11	31	180
	15-16	12	30	103
	16-17	12	31	83
	17-18	9	39	87
	18-19	11	42	97

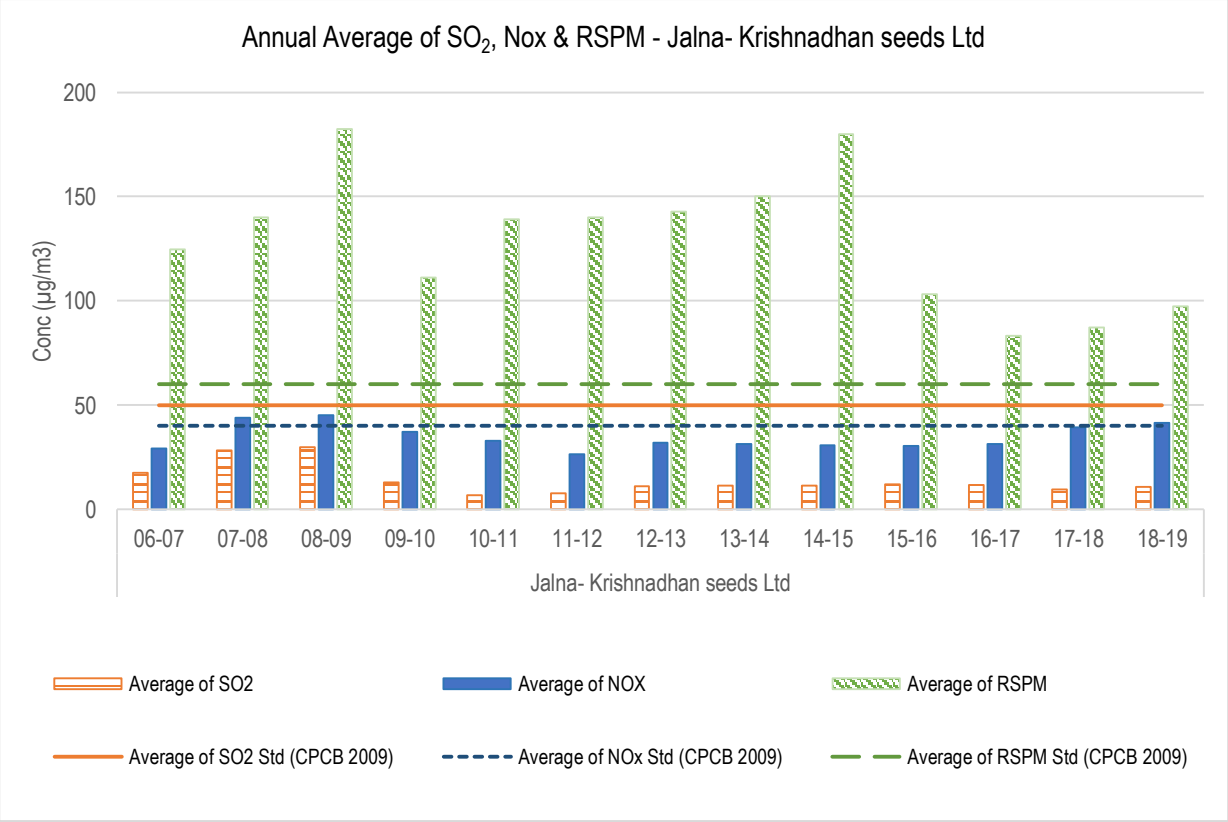


Figure No. 39: Annual average trend of SO_2, NOx, and RSPM at Jalna-Krishnadhan Seeds Ltd.

Latur - MIDC Water Works

Table No. 31: Data for Monthly average reading recorded at MIDC Water Works , Latur

Station Name	Year	Month	Average of SO_2(µg/m³)	Average of NOx(µg/m³)	Average of RSPM(µg/m³)
MIDC Water Works - Latur	2018	Apr	6	23	117
		May	5	23	107
		Jun	5	22	66
		Jul	5	21	64
		Aug	5	22	59
		Sep	5	21	97
		Oct	5	24	72
		Nov	5	19	100
		Dec	6	21	102
	2019	Jan	6	22	81
		Feb	5	22	91
		Mar	5	22	94

Note: Monthly graphs do not have any CPCB Standard[29]

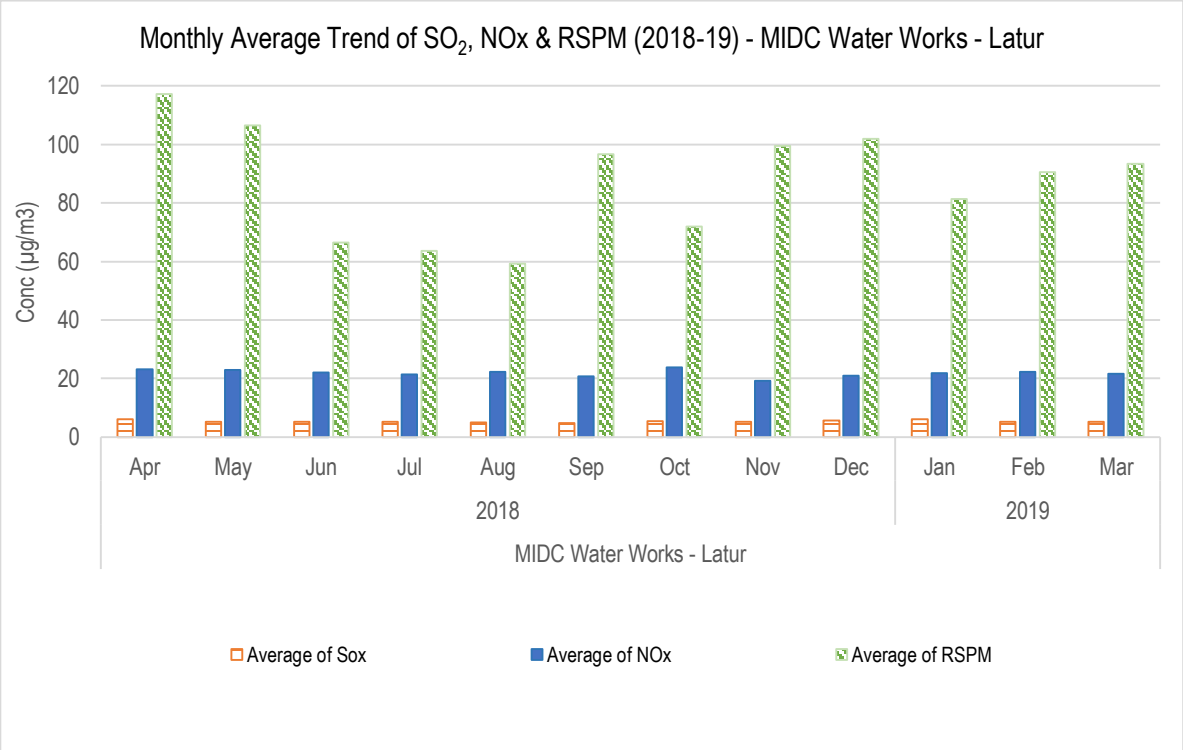


Figure No. 40: Monthly average reading recorded at MIDC Water Works – Latur

[29] https://cpcb.nic.in/air-quality-standard/

Table No. 32: Data for Annual average trend of SO_2, NOx, and RSPM at MIDC Water Works , Latur

Station Name	Year	Average of SO_2(µg/m³)	Average of NO_X(µg/m³)	Average of RSPM(µg/m³)
Annual Permissible Limit (CPCB)		*50*	*40*	*60*
MIDC Water Works - Latur	08-09	4	22	77
	09-10	7	22	76
	10-11	6	15	95
	11-12	6	16	99
	12-13	8	19	82
	13-14	6	16	88
	14-15	5	14	81
	16-17	5	18	70
	17-18	6	21	84
	18-19	5	22	87

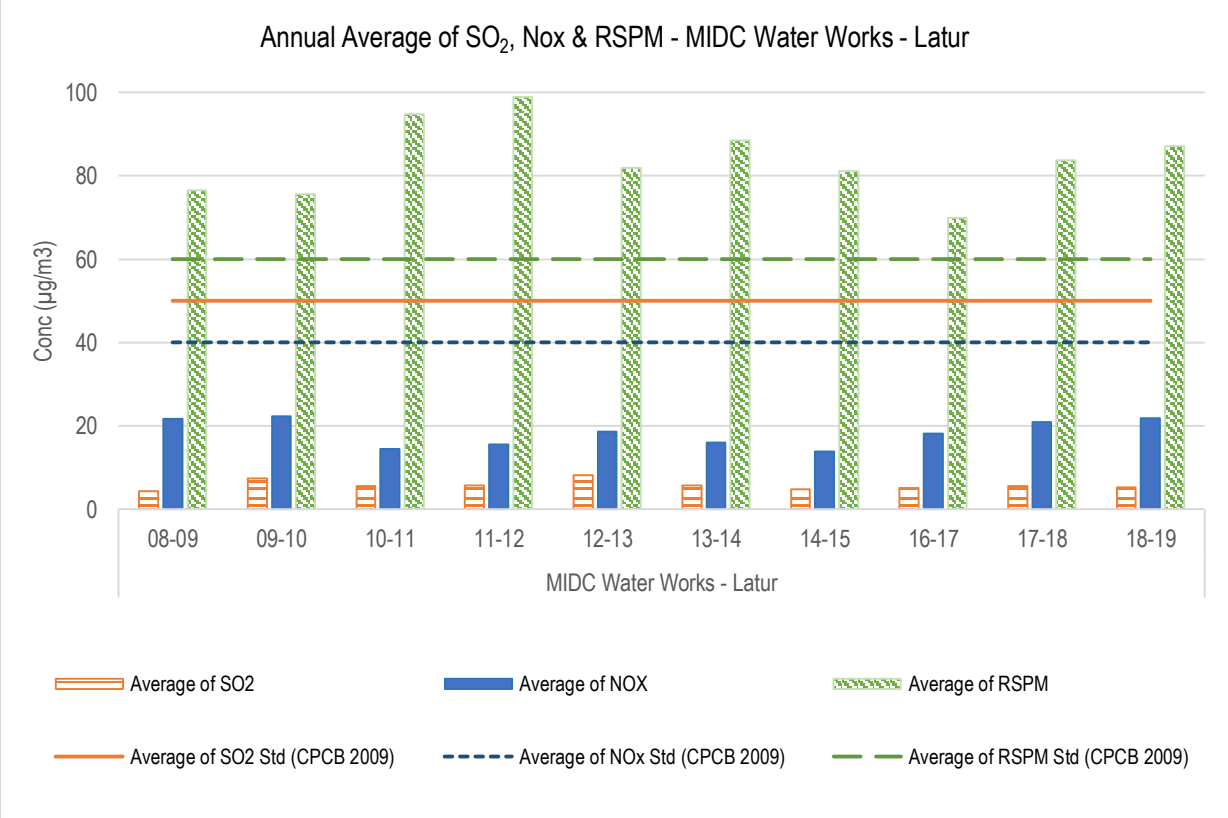


Figure No. 41: Annual average trend of SO_2, NOx, and RSPM at MIDC Water Works - Latur

Latur - Shyam Nagar - Kshewraj Vidyalaya

Table No. 33: Data for Monthly average reading recorded at Shyam Nagar-Kshewraj Vidyalaya

Station Name	Year	Month	Average of SO_2(µg/m³)	Average of NOx(µg/m³)	Average of RSPM(µg/m³)
Shyam Nagar-Kshewraj Vidyalaya	2018	Apr	7	23	112
		May	5	23	106
		Jun	5	21	75
		Jul	5	21	71
		Aug	5	21	69
		Sep	5	22	92
		Oct	6	22	62
		Nov	6	20	106
		Dec	5	15	106
	2019	Jan	6	22	87
		Feb	5	21	93
		Mar	5	22	92

Note: Monthly graphs do not have any CPCB Standard[30]

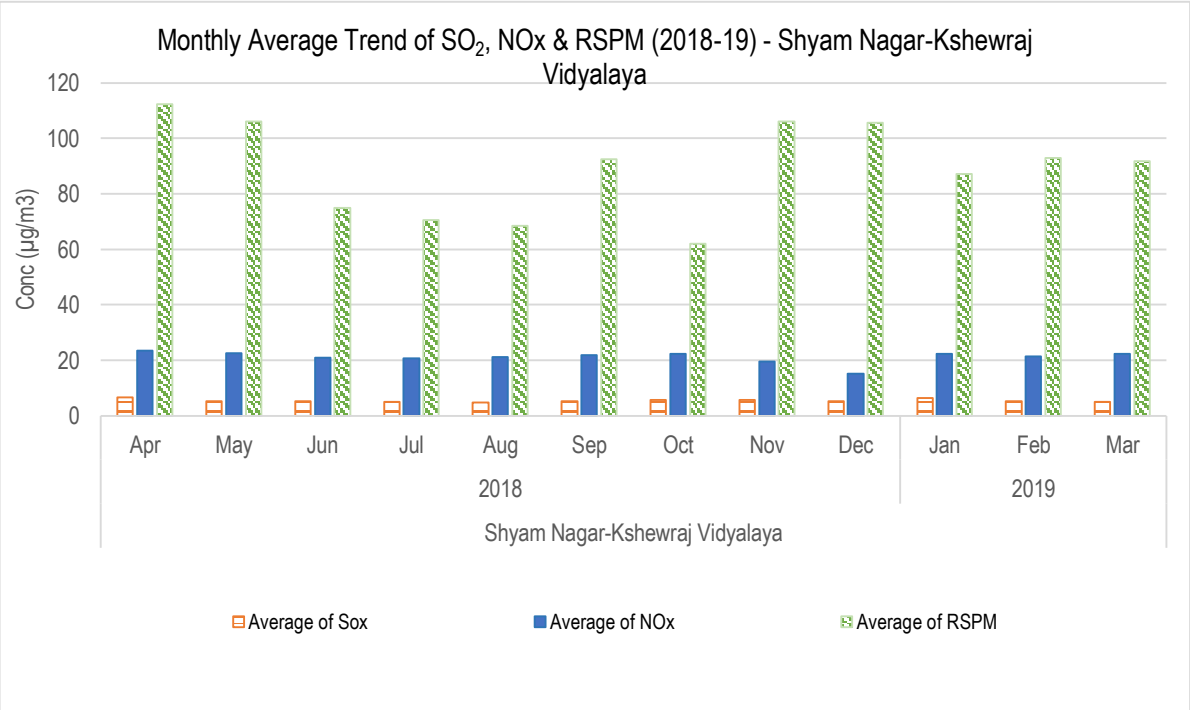


Figure No. 42: Monthly average reading recorded at Shyam Nagar-Kshewraj Vidyalaya

[30] https://cpcb.nic.in/air-quality-standard/

Table No. 34: Data for Annual average trend of SO_2, NOx, and RSPM at Shyam Nagar-Kshewraj Vidyalaya

Station Name	Year	Average of SO_2(µg/m³)	Average of NO_X(µg/m³)	Average of RSPM(µg/m³)
Annual Permissible Liit (CPCB)		*50*	*40*	*60*
Shyam Nagar-Kshewraj Vidyalaya	08-09	3	16	99
	09-10	6	19	123
	10-11	6	13	139
	11-12	6	14	124
	12-13	7	19	105
	13-14	7	17	95
	14-15	5	14	89
	15-16	5	15	85
	16-17	5	18	72
	17-18	6	21	84
	18-19	5	21	89

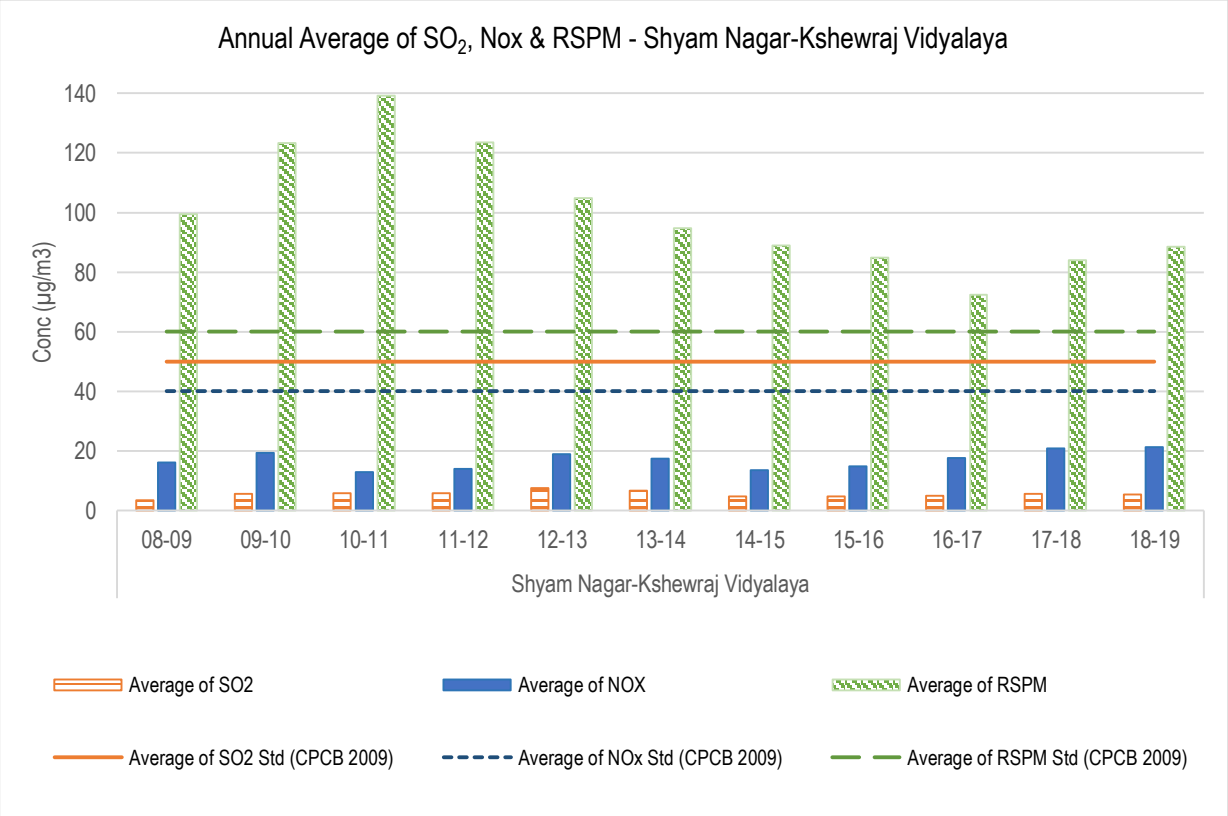


Figure No. 43: Annual average trend of SO_2, NOx, and RSPM at Shyam Nagar-Kshewraj Vidyalaya

Latur - Ganj Golai - Sidhheshwar Bank

Table No. 35: Data for Monthly average reading recorded at Ganj Golai- Sidhheshwar Bank

Station Name	Year	Month	Average of SO_2(µg/m³)	Average of NOx(µg/m³)	Average of RSPM(µg/m³)
Ganj Golai - Sidhheshwar Bank	2018	Apr	6	24	106
		May	5	23	97
		Jun	5	22	63
		Jul	5	21	77
		Aug	5	22	62
		Sep	5	21	90
		Oct	5	23	93
		Nov	6	21	105
		Dec	5	17	98
	2019	Jan	6	22	93
		Feb	5	23	103
		Mar	5	21	96

Note: Monthly graphs do not have any CPCB Standard[31]

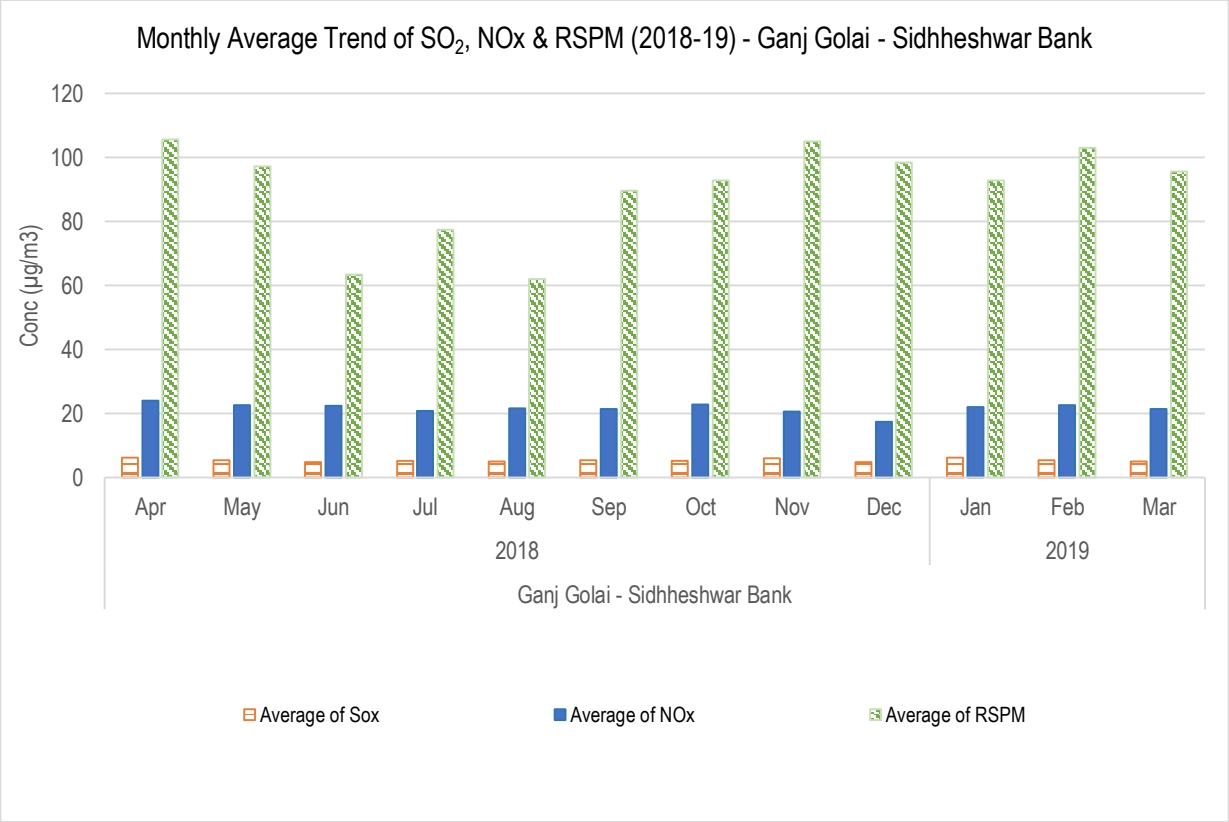


Figure No. 44: Monthly average reading recorded at Ganj Golai- Sidhheshwar Bank

[31] https://cpcb.nic.in/air-quality-standard/

Table No. 36: Data for Annual average trend of SO_2, NOx, and RSPM at Ganj Golai- Sidhheshwar Bank

Station Name	Year	Average of SO_2(µg/m³)	Average of NO_X(µg/m³)	Average of RSPM(µg/m³)
Annual Permissible Limit (CPCB)				
Ganj Golai - Sidhheshwar Bank	08-09	4	22	122
	09-10	6	26	144
	10-11	6	16	124
	11-12	6	17	140
	12-13	8	20	132
	13-14	7	18	107
	14-15	5	14	73
	15-16	5	17	80
	16-17	6	18	65
	17-18	6	21	78
	18-19	5	22	89

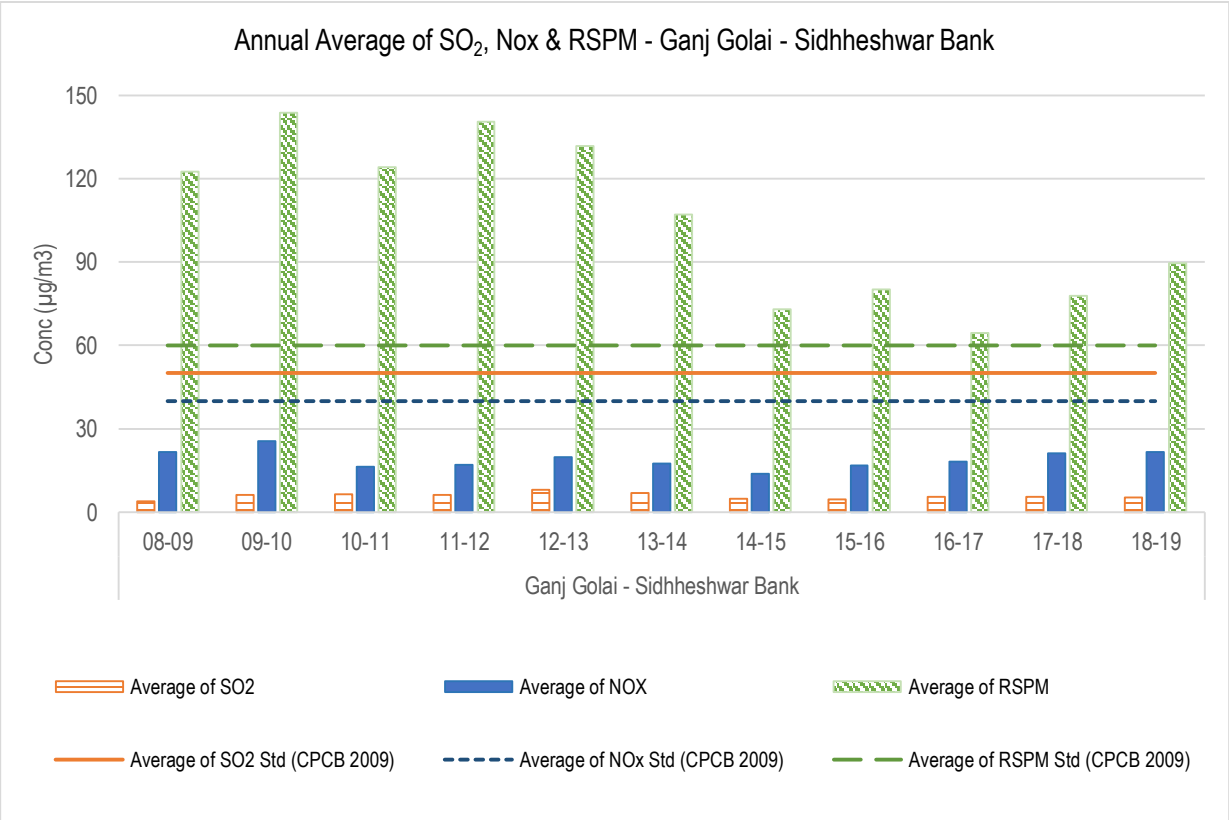


Figure No. 45: Annual average trend of SO_2, NOx, and RSPM at Ganj Golai- Sidhheshwar Bank

Aurangabad - Aurangabad CAAQMS

Table No. 37: Data for Monthly average reading recorded at Aurangabad CAAQMS

Station Name	Year	Month	Average of SO_2(µg/m³)	Average of NOx(µg/m³)	Average of RSPM(µg/m³)
Aurangabad CAAQMS	2018	Apr	5	15	109
		May	5	21	106
		Jun	5	32	56
		Jul	5	19	48
		Aug	5	15	52
		Sep	5	1	61
		Oct	5	10	84
		Nov	5	13	105
		Dec	5	16	79
	2019	Jan	6	14	67
		Feb	8	15	65
		Mar	8	18	70

Note: Monthly graphs do not have any CPCB Standard[32]

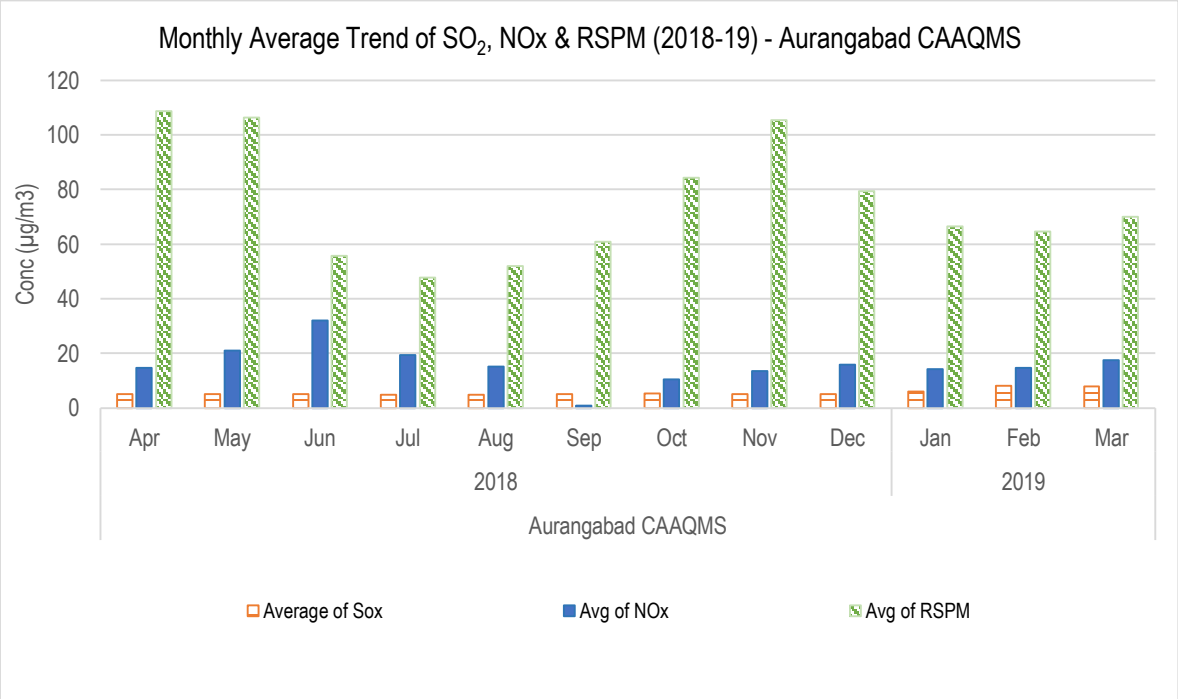


Figure No. 46: Monthly average reading recorded at Aurangabad CAAQMS

[32] https://cpcb.nic.in/air-quality-standard/

Table No. 38: Data for Annual average trend of SO_2, NOx, and RSPM at Aurangabad CAAQMS

Station Name	Year	Average of SO_2(µg/m³)	Average of NO_X(µg/m³)	Average of RSPM(µg/m³)
Annual Permissible Limit (CPCB)		*50*	*40*	*60*
Aurangabad CAAQMS	16-17	5	33	86
	17-18	5	36	71
	18-19	6	19	74

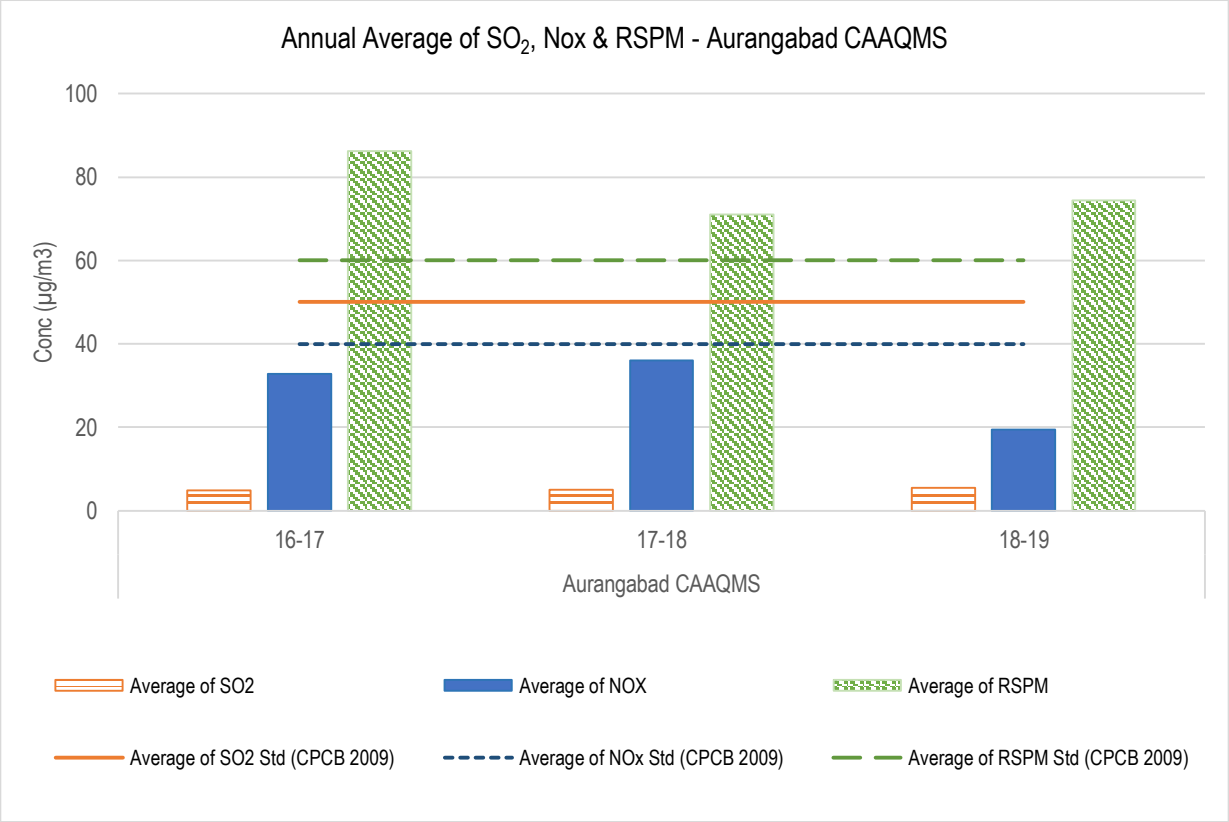
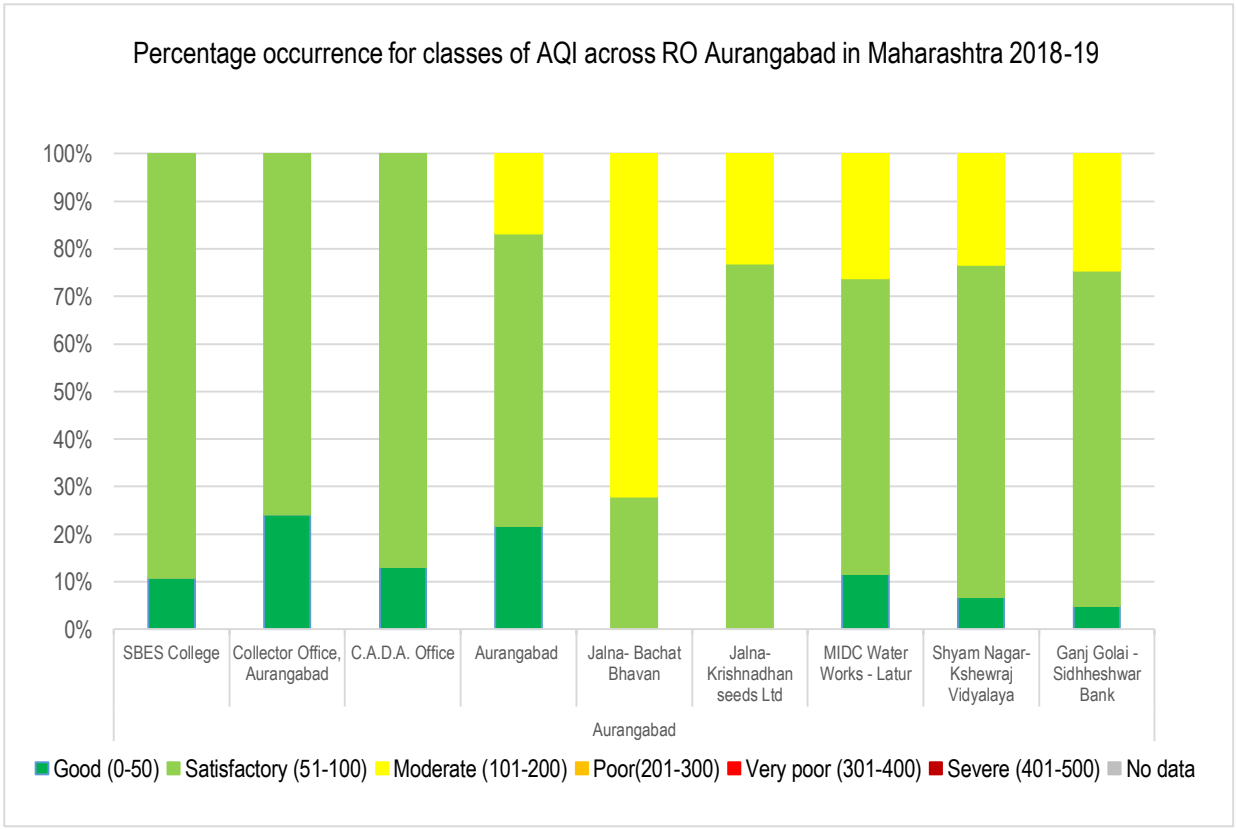


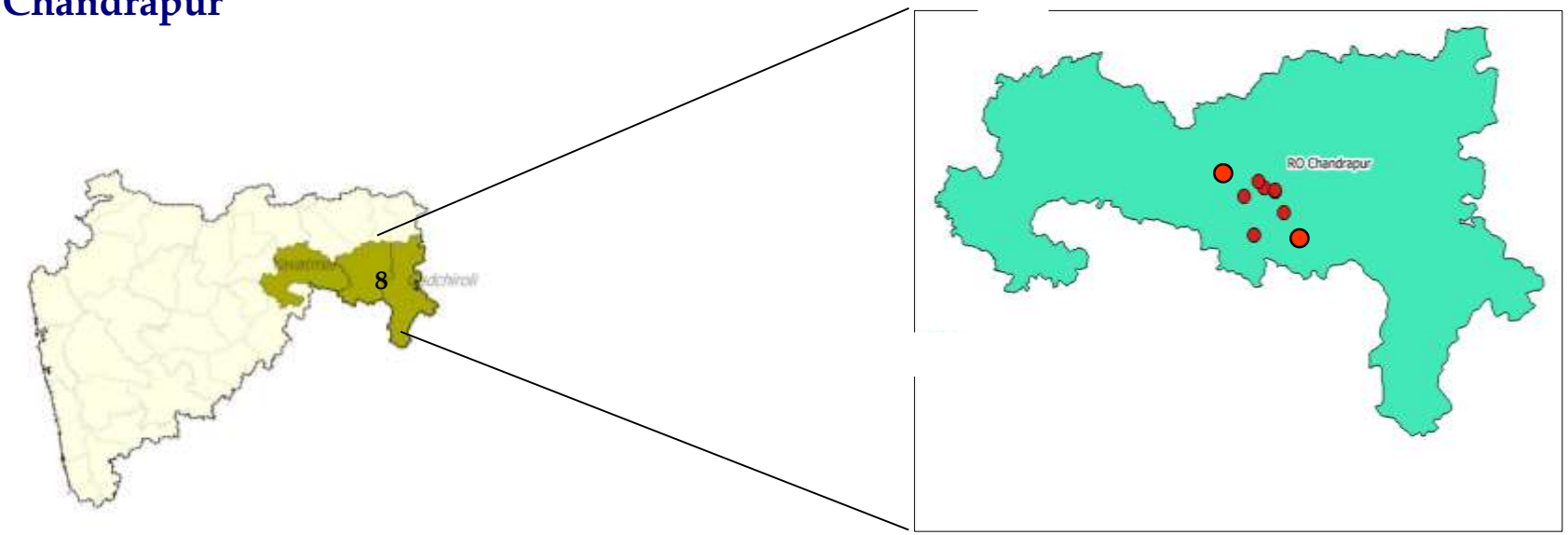
Figure No. 47: Annual average trend of SO_2, NOx, and RSPM at Aurangabad CAAQMS

Table No. 39: Percentage exceedance of pollutants at Aurangabad RO

Station Name	Total Observations	Exceedence			% Exceedence		
		SO2	NOx	RSPM	SO2	NOx	RSPM
SBES College	83	0	22	66	0	27	80
Collector Office, Aurangabad	54	0	0	34	0	0	63
C.A.D.A. Office	84	0	19	63	0	23	75
Aurangabad	349	0	0	243	0	0	70
Jalna- Bachat Bhavan	104	0	48	104	0	46	100
Jalna- Krishnadhan seeds Ltd	104	0	56	104	0	54	100
MIDC Water Works - Latur	104	0	0	85	0	0	83
Shyam Nagar-Kshewraj Vidyalaya	106	0	0	92	0	0	89
Ganj Golai - Sidhheshwar Bank	102	0	1	95	0	1	93



RO – Chandrapur



MPCB RO	Region	Station code	Station name	Type	Latitude (deg)	Longitude (deg)
Chandrapur	Chandrapur	267	Ghuggus	Residential	19° 56' 23.0" N	79° 06' 50.9" E
	Chandrapur	281	Chandrapur - MIDC	Industrial	19° 58' 58.3" N	79° 13' 54.7" E
	Chandrapur	396	Chandrapur - SRO MPCB	Residential	19° 57' 55.9" N	79° 17' 59.1" E
	Chandrapur	638	Tadali MIDC	Industrial	20° 00' 59.6" N	79° 11' 51.5" E
	Chandrapur	639	Ballarshah	Residential	19° 51' 11.8" N	79° 20' 55.7" E
	Chandrapur	640	Rajura	Industrial	19° 44' 11.7" N	79° 10' 29.5" E
	Chandrapur		Chandrapur CAAQMS	Industrial	19° 57' 44.67"N	79° 17' 57.81"E
	Chandrapur		Civil lines,Chandrapur	Commercial	19° 58' 13.66"N	79° 18' 05.34"E

Chandrapur - Ghuggus

Table No. 40: Data for Monthly average reading recorded at Ghuggus - Chandrapur

Station Name	Year	Month	Average of SO_2(µg/m³)	Average of NOx(µg/m³)	Average of RSPM(µg/m³)
Ghuggus	2018	Apr	4	28	284
		May	4	31	317
		Jun	4	31	32
		Jul	4	24	138
		Aug	4	28	133
		Sep	4	27	166
		Oct	5	32	245
		Nov	4	29	244
		Dec	5	28	138
	2019	Jan	4	37	251
		Feb	5	26	169
		Mar	4	33	248

Note: Monthly graphs do not have any CPCB Standard[33]

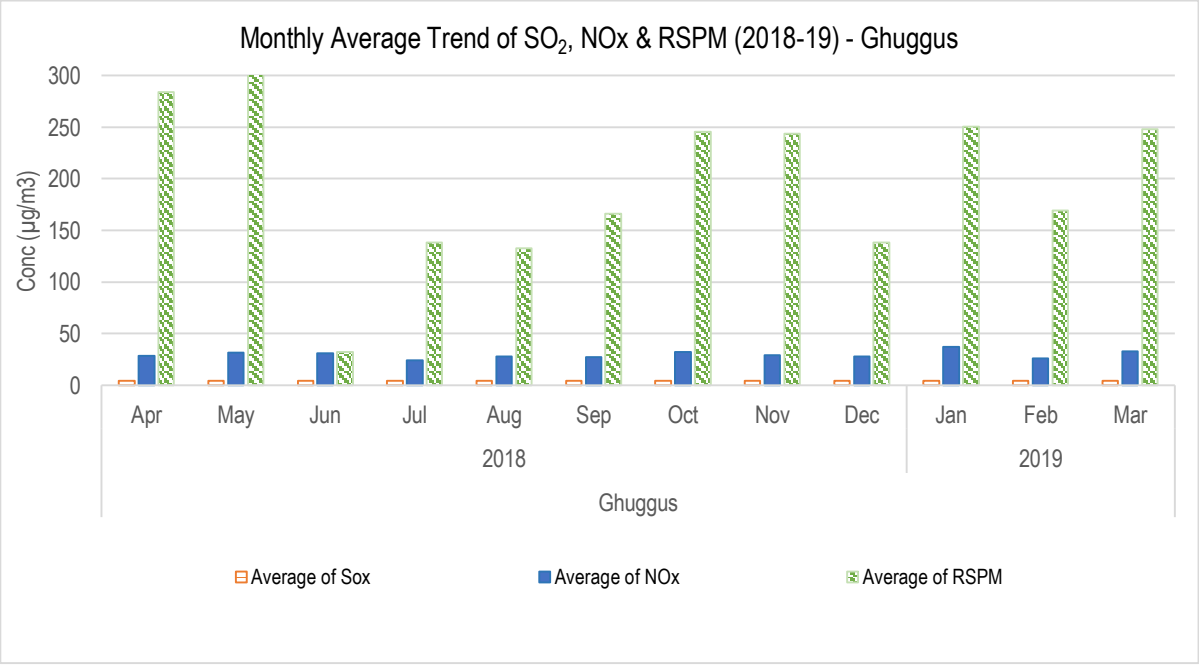


Figure No. 48: Monthly average reading recorded at Ghuggus - Chandrapur

[33] https://cpcb.nic.in/air-quality-standard/

Table No. 41: Data for Annual average trend of SO_2, NOx, and RSPM at Ghuggus - Chandrapur

Station Name	Year	Average of SO_2(µg/m³)	Average of NO^X(µg/m³)	Average of RSPM(µg/m³)
Annual Permissible Limit (CPCB)		***50***	***40***	***60***
Ghuggus	04-05	18	28	80
	05-06	21	31	131
	06-07	31	39	139
	07-08	36	53	186
	08-09	34	54	172
	09-10	46	32	180
	10-11	23	24	211
	11-12	18	21	206
	12-13	11	13	207
	13-14	9	19	174
	14-15	9	14	140
	15-16	4	17	180
	16-17	4	25	242
	17-18	4	26	298
	18-19	4	29	175

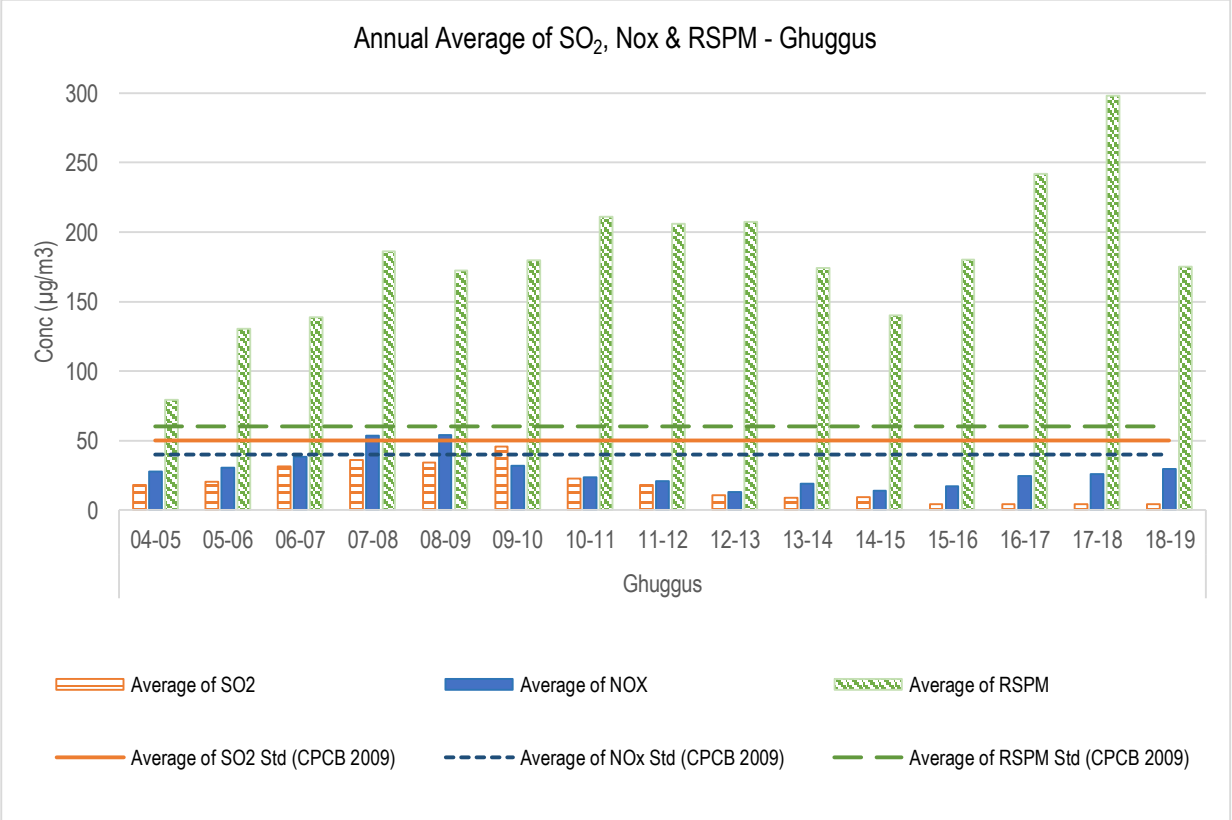


Figure No. 49: Annual average trend of SO_2, NOx, and RSPM at Ghuggus - Chandrapur

Chandrapur - Chandrapur - MIDC

Table No. 42: Data for Monthly average reading recorded at Chandrapur - MIDC

Station Name	Year	Month	Average of SO_2(µg/m³)	Average of NOx(µg/m³)	Average of RSPM(µg/m³)
Chandrapur - MIDC	2018	Apr	4	29	101
		May	4	33	101
		Jun	4	31	90
		Jul	4	26	62
		Aug	4	33	56
		Sep	4	37	91
		Oct	4	34	114
		Nov	4	27	92
		Dec	4	29	81
	2019	Jan	4	37	101
		Feb	4	30	86
		Mar	4	32	100

Note: Monthly graphs do not have any CPCB Standard[34]

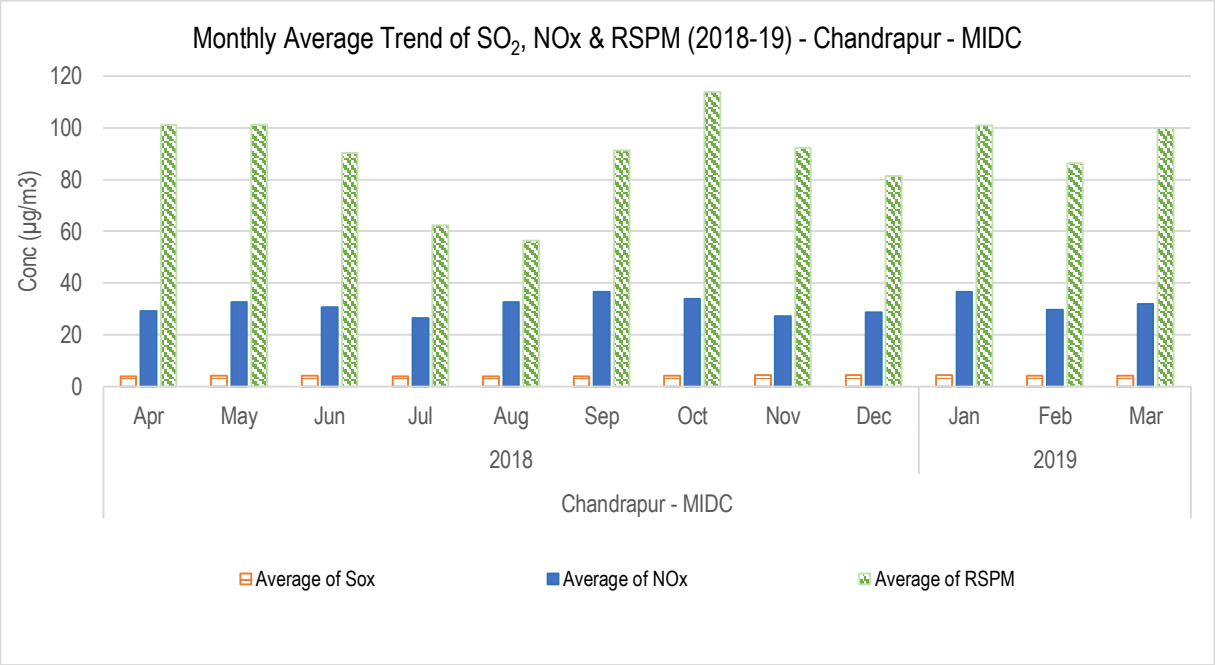


Figure No. 50: Monthly average reading recorded at Chandrapur – MIDC

[34] https://cpcb.nic.in/air-quality-standard/

Table No. 43: Data for Annual average trend of SO_2, NOx, and RSPM at Chandrapur - MIDC

Station Name	Year	Average of SO_2(µg/m³)	Average of NO_X(µg/m³)	Average of RSPM(µg/m³)
Annual Permissible Limit (CPCB)		*50*	*40*	*60*
Chandrapur - MIDC	04-05	25	37	110
	05-06	26	37	130
	06-07	38	41	123
	07-08	37	50	125
	08-09	34	53	148
	09-10	63	31	141
	10-11	25	25	150
	11-12	21	35	131
	12-13	14	17	105
	13-14	18	27	60
	14-15	14	30	70
	15-16	7	26	75
	16-17	4	34	77
	17-18	4	28	74
	18-19	4	31	90

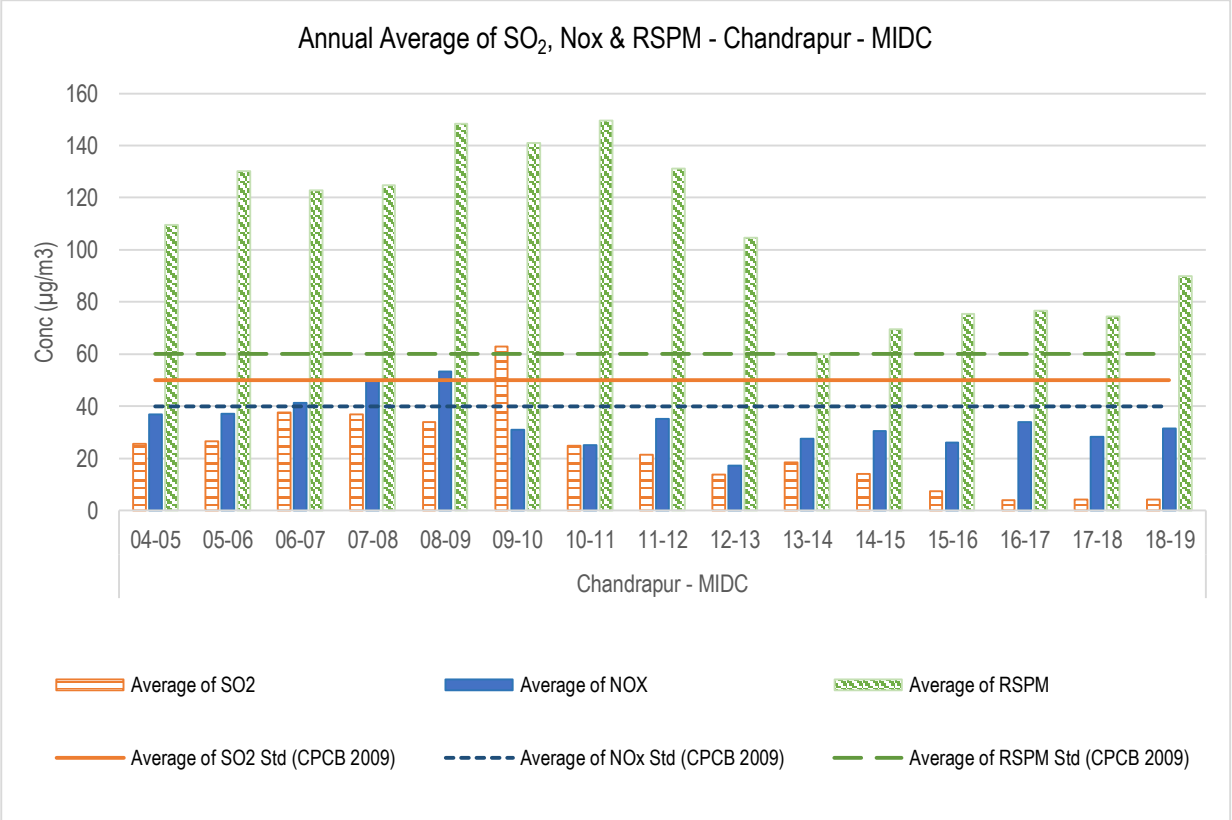


Figure No. 51: Annual average trend of SO_2, NOx, and RSPM at Chandrapur – MIDC

Chandrapur - Chandrapur- SRO MPCB

Table No. 44: Data for Monthly average reading recorded at Chandrapur- SRO MPCB

Station Name	Year	Month	Average of SO_2(µg/m³)	Average of NOx(µg/m³)	Average of RSPM(µg/m³)
Chandrapur - SRO MPCB	2018	Apr	4	31	82
		May	4	31	82
		Jun	4	33	66
		Jul	4	27	85
		Aug	4	29	67
		Sep	4	40	82
		Oct	4	32	84
		Nov	6	29	96
		Dec	4	28	107
	2019	Jan	4	37	117
		Feb	5	29	100
		Mar	4	32	84

Note: Monthly graphs do not have any CPCB Standard[35]

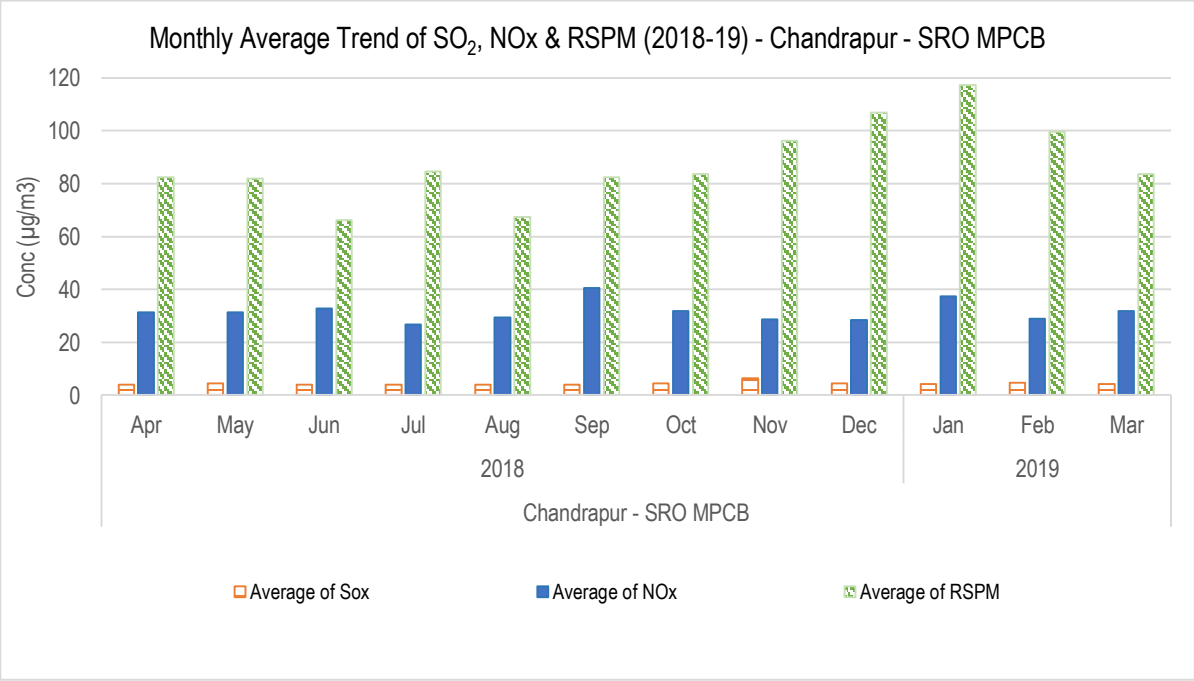


Figure No. 52: Monthly average reading recorded at Chandrapur- SRO MPCB

[35] https://cpcb.nic.in/air-quality-standard/

Table No. 45: Data for Annual average trend of SO_2, NOx, and RSPM at Chandrapur - SRO MPCB

Station Name	Year	Average of SO_2(µg/m³)	Average of NO_X(µg/m³)	Average of RSPM(µg/m³)
Annual Permissible Limit (CPCB)		***50***	***40***	***60***
Chandrapur - SRO MPCB	04-05	23	34	107
	05-06	20	30	116
	06-07	31	38	130
	07-08	30	46	161
	08-09	26	45	159
	09-10	41	35	74
	10-11	21	27	92
	11-12	18	31	66
	12-13	14	17	75
	13-14	10	26	66
	14-15	7	23	87
	15-16	4	20	70
	16-17	4	28	84
	17-18	4	29	90
	18-19	4	32	89

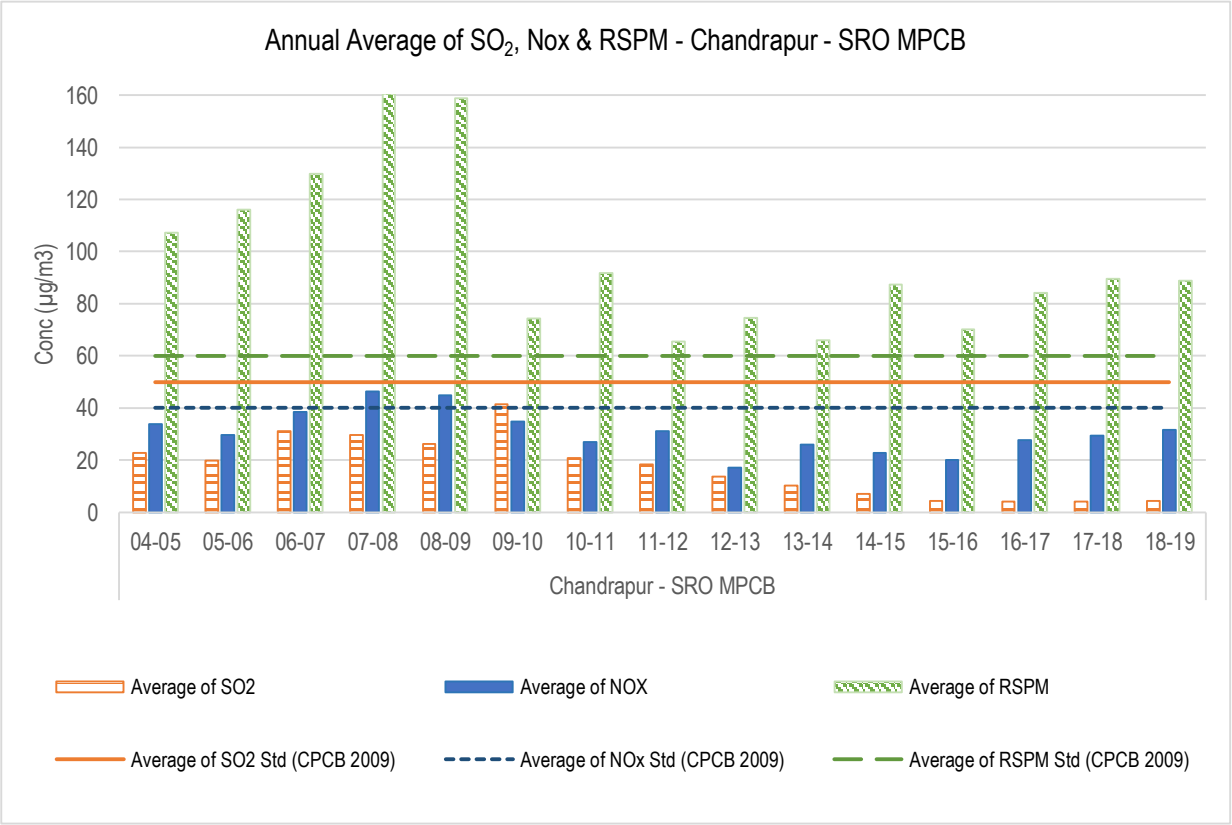


Figure No. 53: Annual average trend of SO_2, NOx, and RSPM at Chandrapur - SRO MPCB

Chandrapur - Tadali MIDC

Table No. 46: Data for Monthly average reading recorded at Tadali MIDC

Station Name	Year	Month	Average of SO_2(µg/m³)	Average of NOx(µg/m³)	Average of RSPM(µg/m³)
Tadali MIDC	2018	Apr	4	27	116
		May	4	30	127
		Jun	4	31	154
		Jul	4	28	100
		Aug	4	28	75
		Sep	4	29	99
		Oct	5	32	117
		Nov	4	31	105
		Dec	5	30	84
	2019	Jan	4	38	107
		Feb	5	29	100
		Mar	4	33	115

Note: Monthly graphs do not have any CPCB Standard[36]

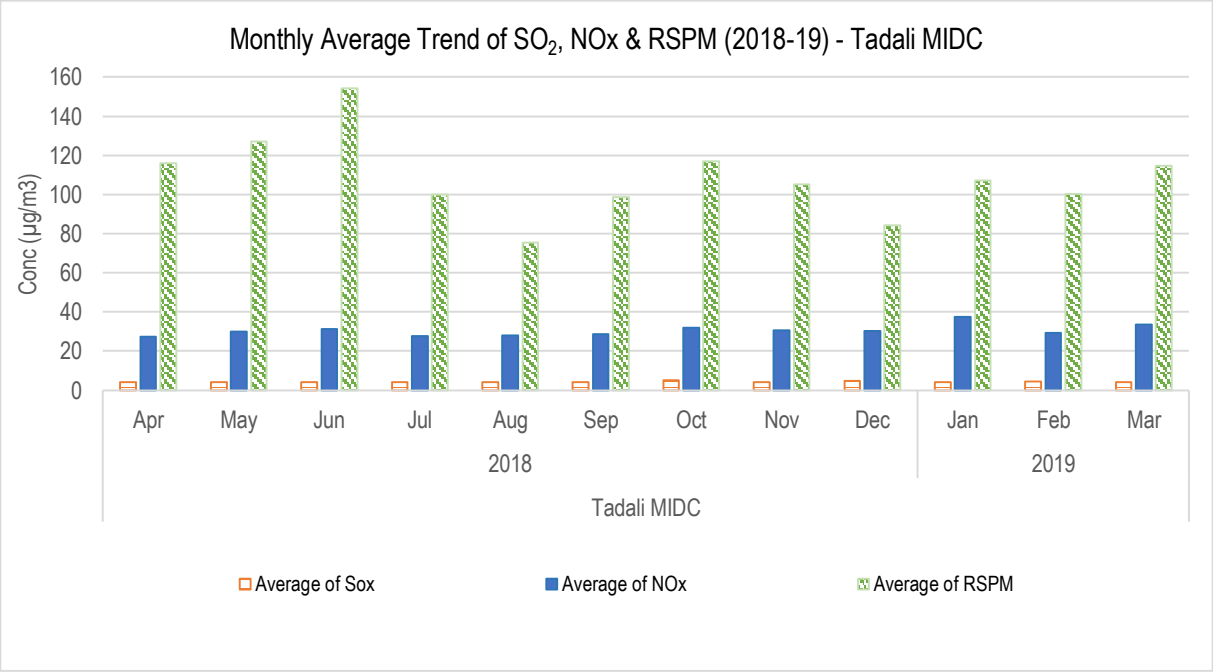


Figure No. 54: Monthly average reading recorded at Tadali MIDC

[36] https://cpcb.nic.in/air-quality-standard/

Table No. 47: Data for Annual average trend of SO_2, NOx, and RSPM at Tadali MIDC

Station Name	Year	Average of SO_2(µg/m³)	Average of NO_X(µg/m³)	Average of RSPM(µg/m³)
Annual Permissible Limit (CPCB)		*50*	*40*	*60*
Tadali MIDC	09-10	29	19	169
	10-11	18	20	216
	11-12	16	18	151
	12-13	9	13	173
	13-14	7	16	195
	14-15	7	15	112
	15-16	4	20	58
	16-17	4	23	79
	17-18	4	27	110
	18-19	4	30	107

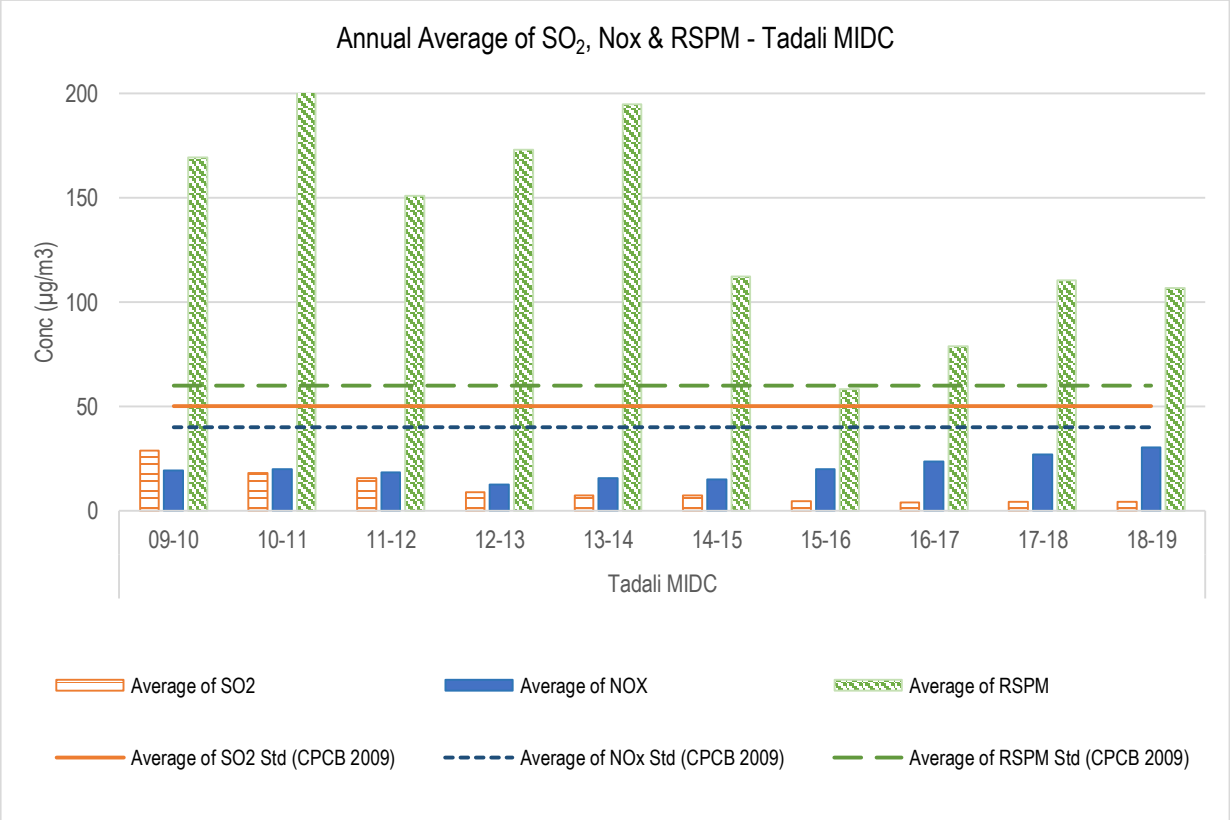


Figure No. 55: Annual average trend of SO_2, NOx, and RSPM at Tadali MIDC

Chandrapur - Ballarshah

Table No. 48: Data for Monthly average reading recorded at Ballarshah

Station Name	Year	Month	Average of SO_2(µg/m³)	Average of NOx(µg/m³)	Average of RSPM(µg/m³)
Ballarshah	2018	Apr	4	33	125
		May	4	36	129
		Jun	4	33	104
		Jul	4	24	100
		Aug	4	33	82
		Sep	4	35	115
		Oct	4	38	127
		Nov	4	29	129
		Dec	4	39	139
	2019	Jan	4	33	138
		Feb	5	32	127
		Mar	4	33	128

Note: Monthly graphs do not have any CPCB Standard[37]

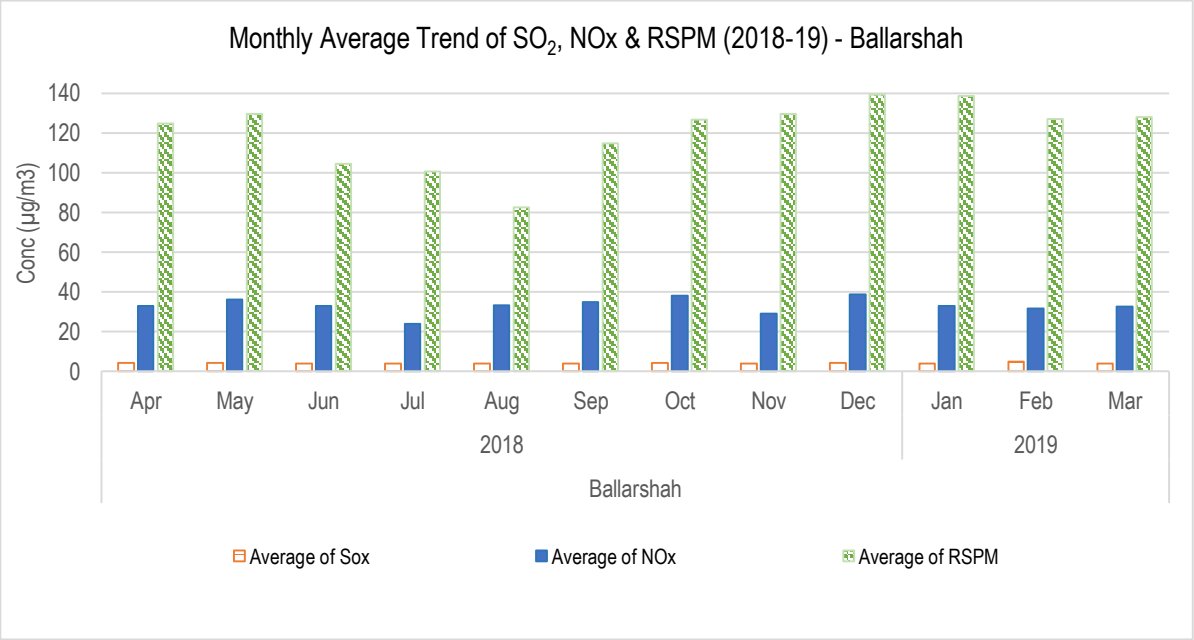


Figure No. 56: Monthly average reading recorded at Ballarshah

[37] https://cpcb.nic.in/air-quality-standard/

Table No. 49: Data for Annual average trend of SO_2, NOx, and RSPM at Ballarshah

Station Name	Year	Average of SO_2(µg/m³)	Average of NO_X(µg/m³)	Average of RSPM(µg/m³)
Annual Permissible Limit (CPCB)		*50*	*40*	*60*
Ballarshah	09-10	32	35	122
	10-11	17	32	129
	11-12	19	24	123
	12-13	9	19	192
	13-14	10	37	135
	14-15	10	48	130
	15-16	4	28	123
	16-17	4	32	108
	17-18	4	29	132
	18-19	4	33	120

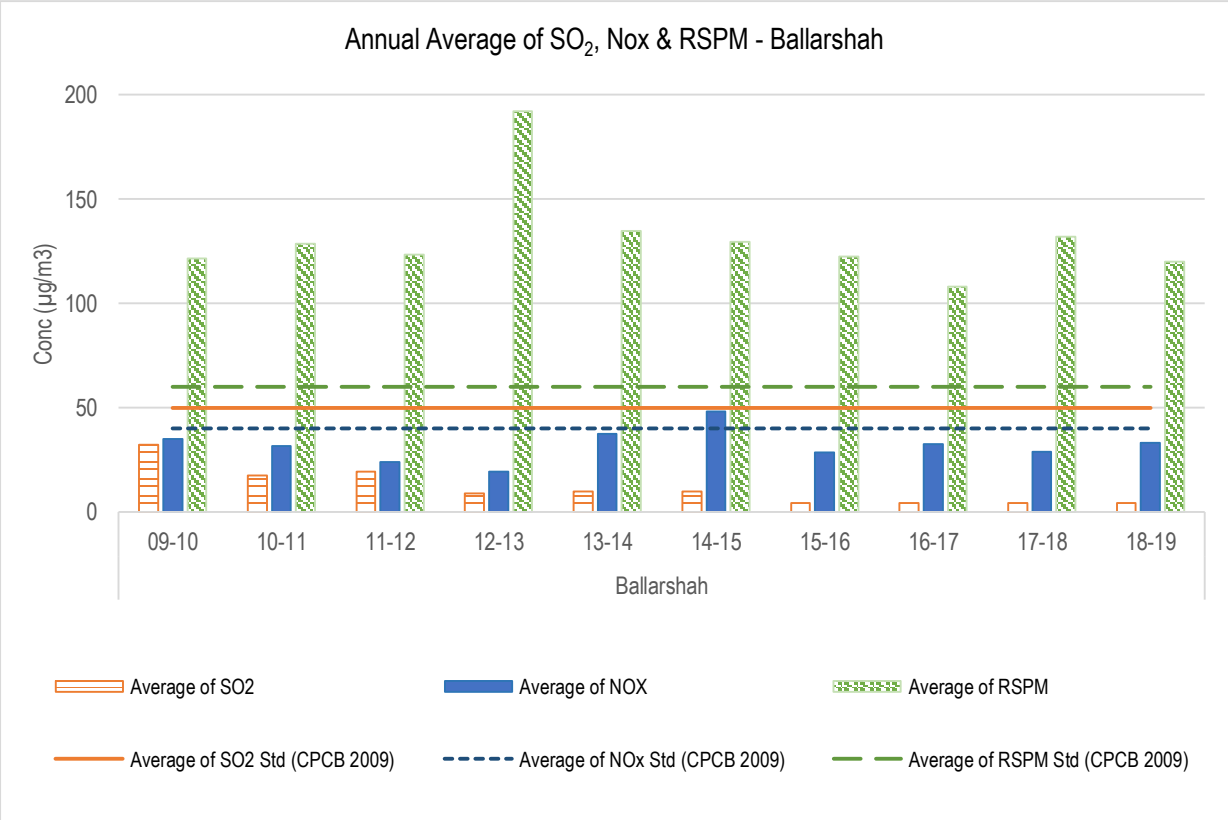


Figure No. 57: Annual average trend of SO_2, NOx, and RSPM at Ballarshah

Chandrapur - Rajura

Table No. 50: Data for Monthly average reading recorded at Rajura

Station Name	Year	Month	Average of SO_2(µg/m³)	Average of NOx(µg/m³)	Average of RSPM(µg/m³)
Rajura	2018	Apr	4	30	163
		May	4	32	184
		Jun	4	30	144
		Jul	4	24	127
		Aug	4	29	113
		Sep	4	35	138
		Oct	4	37	130
		Nov	4	27	136
		Dec	4	30	128
	2019	Jan	4	34	139
		Feb	5	32	143
		Mar	4	36	147

Note: Monthly graphs do not have any CPCB Standard[38]

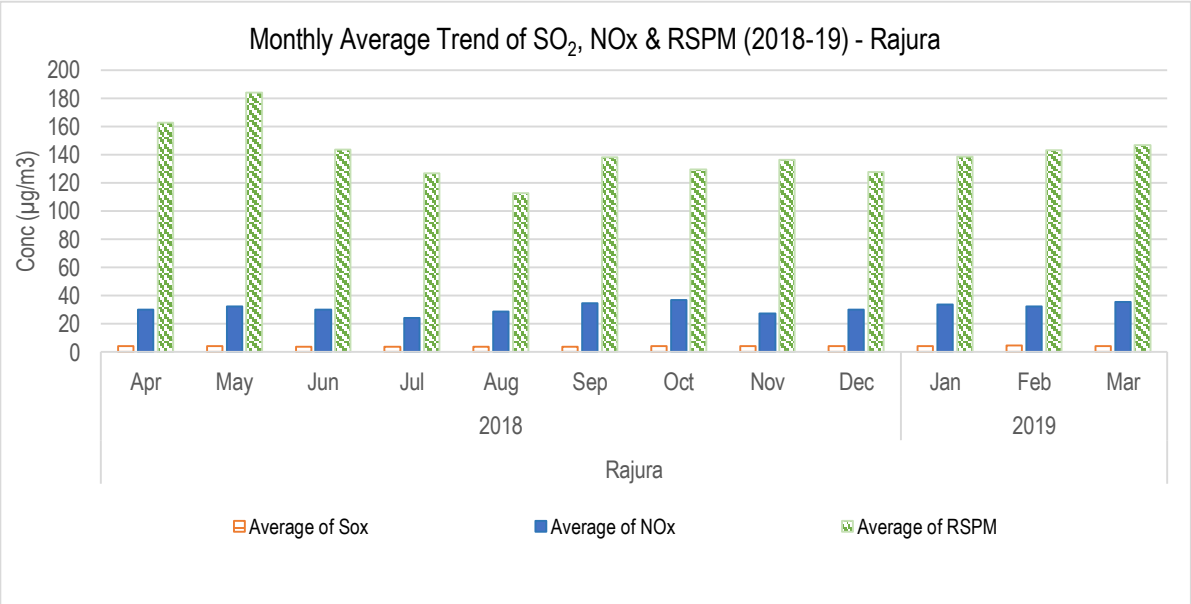


Figure No. 58: Monthly average reading recorded at Rajura

[38] https://cpcb.nic.in/air-quality-standard/

Table No. 51: Data for Annual average trend of SO_2, NOx, and RSPM at Rajura

Station Name	Year	Average of SO_2(µg/m³)	Average of NO_X(µg/m³)	Average of RSPM(µg/m³)
Annual Permissible Limit (CPCB)		*50*	*40*	*60*
Rajura	09-10	34	37	119
	10-11	17	19	115
	11-12	16	19	159
	12-13	9	21	196
	13-14	10	31	145
	14-15	7	17	144
	15-16	4	17	127
	16-17	4	27	156
	17-18	4	27	185
	18-19	4	31	134

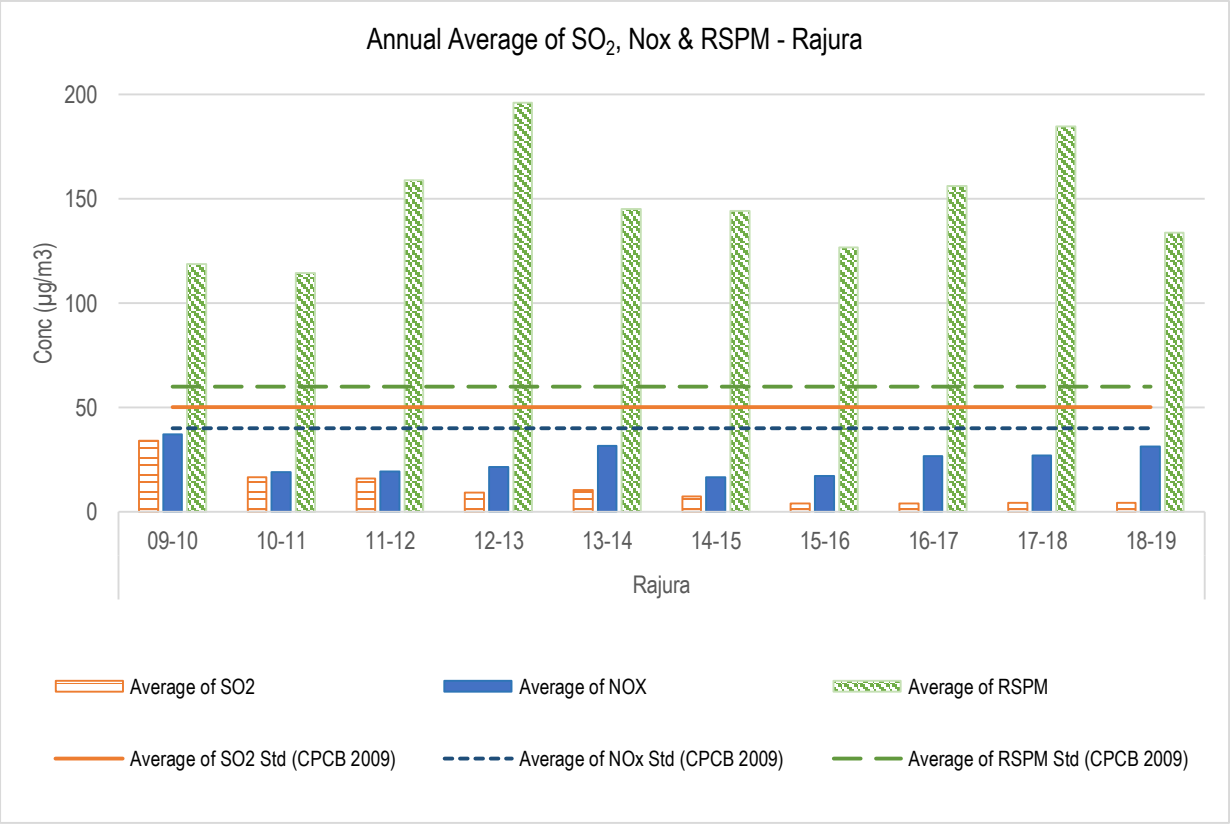


Figure No. 59: Annual average trend of SO_2, NOx, and RSPM at Rajura

Chandrapur - Chandrapur CAAQMS

Table No. 52: Data for Monthly average reading recorded at Chandrapur CAAQMS

Station Name	Year	Month	Average of SO_2(µg/m³)	Average of NOx(µg/m³)	Average of RSPM(µg/m³)
Chandrapur CAAQMS	2018	Apr	2	11	83
		May	2	6	84
		Jun	1	9	45
		Jul	3	12	42
		Aug	4	9	41
		Sep	4	9	64
		Oct	4	10	123
		Nov	5	10	85
		Dec	5	15	90
	2019	Jan	6	11	87
		Feb	4	10	70
		Mar	4	10	70

Note: Monthly graphs do not have any CPCB Standard[39]

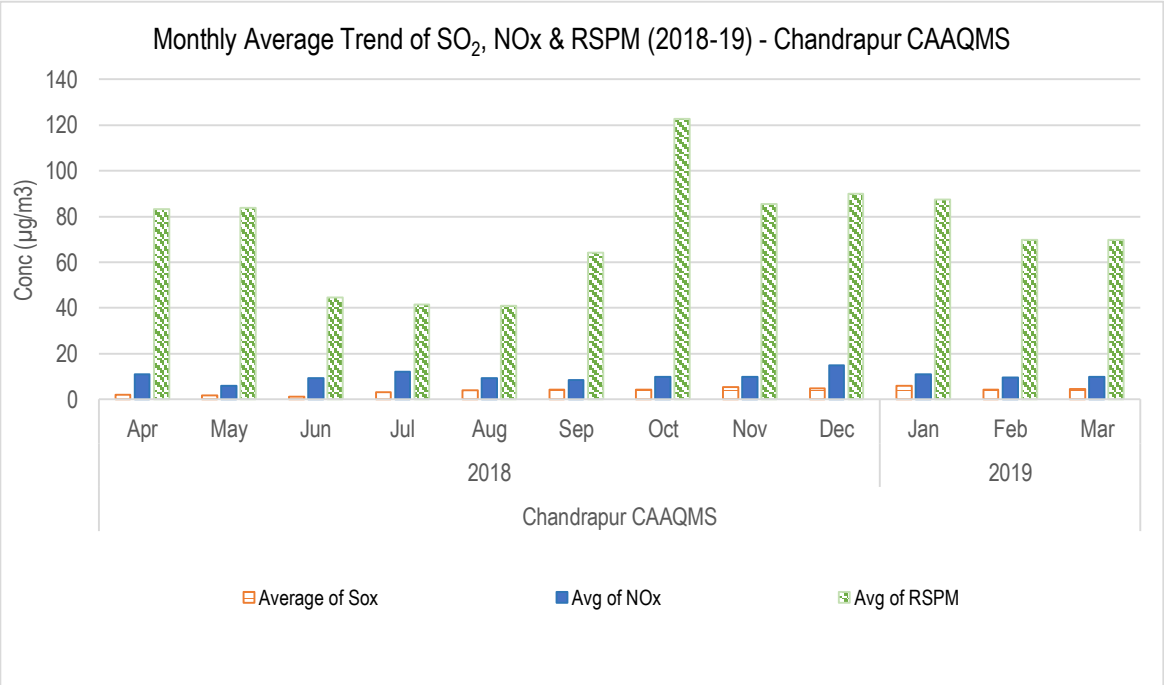


Figure No. 60: Monthly average reading recorded at Chandrapur CAAQMS

[39] https://cpcb.nic.in/air-quality-standard/

Table No. 53: Data for Annual average trend of SO_2, NOx, and RSPM at Chandrapur CAAQMS

Station Name	Year	Average of SO_2(µg/m³)	Average of NO_X(µg/m³)	Average of RSPM(µg/m³)
Annual Permissible Limit (CPCB)				
Chandrapur CAAQMS	16-17	13	19	69
	17-18	8	19	64
	18-19	4	10	73

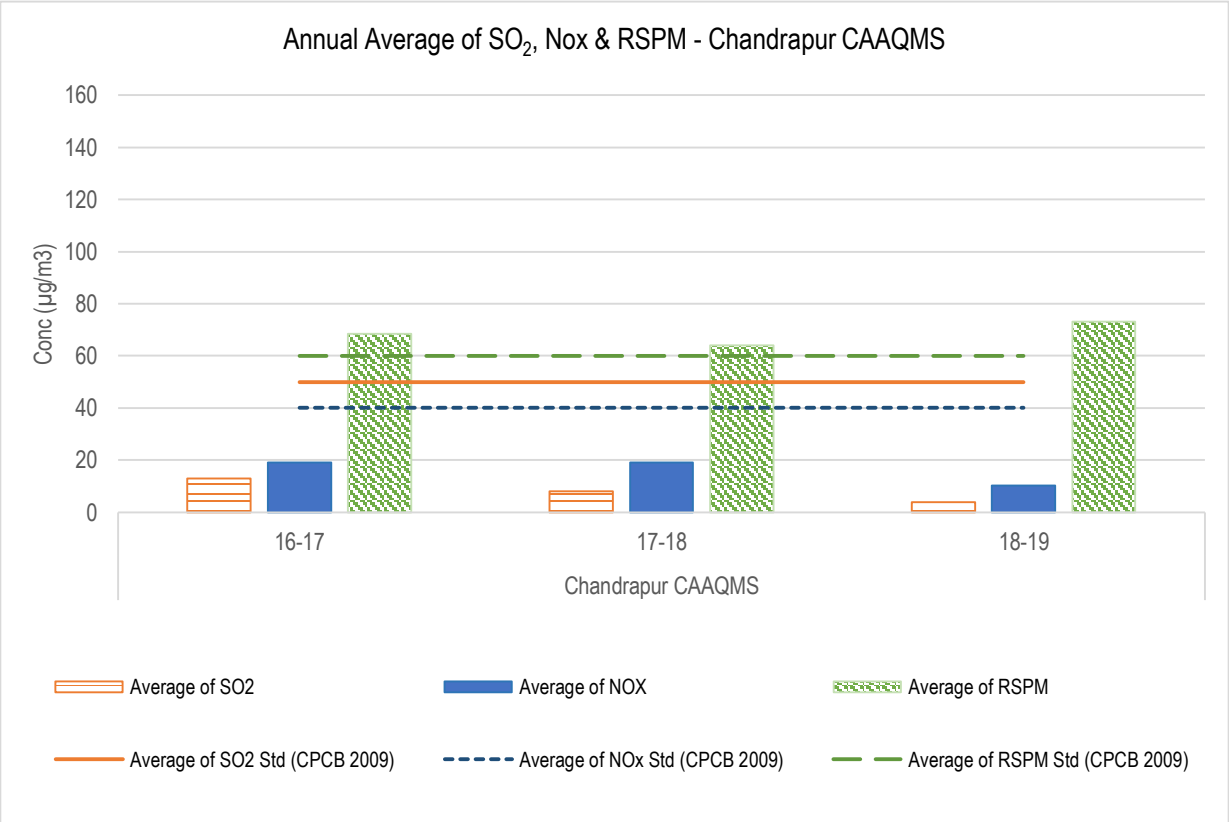


Figure No. 61: Annual average trend of SO_2, NOx, and RSPM at Chandrapur CAAQMS

Chandrapur - Civil Lines

Table No. 54: Data for Monthly average reading recorded at Civil Lines Chandrapur

Station Name	Year	Month	Average of SO_2(µg/m³)	Average of NOx(µg/m³)	Average of RSPM(µg/m³)
Civil lines, Chandrapur	2018	Apr	9	23	119
		May	9	21	110
		Jun	9	23	85
		Jul	8	24	50
		Aug	8	25	62
		Sep	9	25	86
		Oct	9	21	118
		Nov	9	22	130
		Dec	9	22	128
	2019	Jan	9	25	137
		Feb	9	24	136
		Mar	9	23	140

Note: Monthly graphs do not have any CPCB Standard[40]

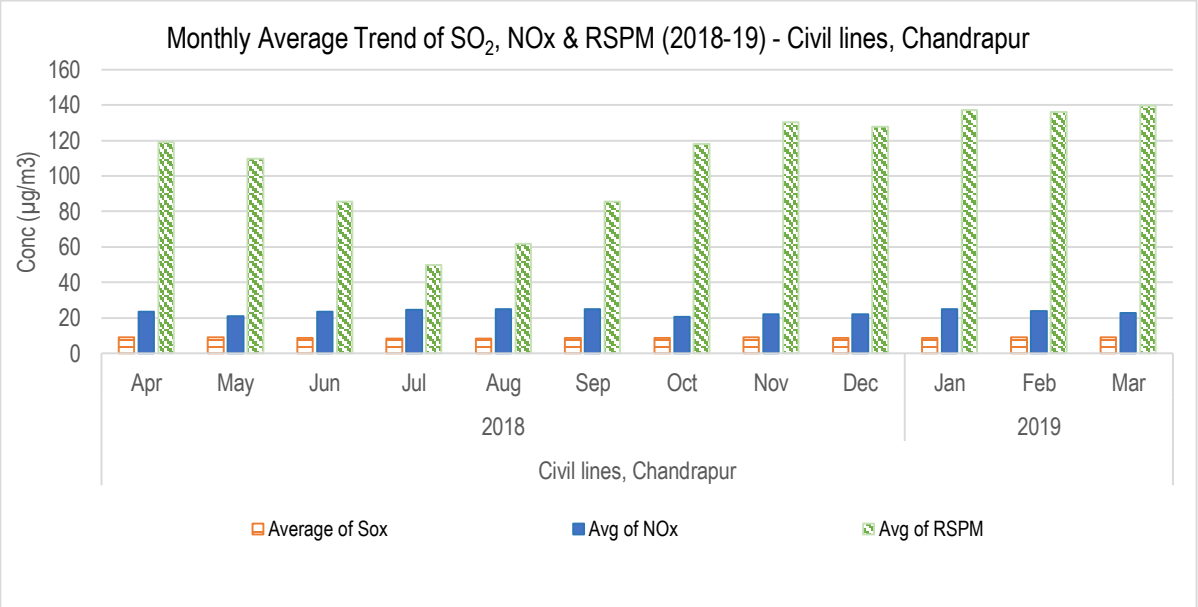


Figure No. 62: Monthly average reading recorded at Civil Lines Chandrapur

[40] https://cpcb.nic.in/air-quality-standard/

Table No. 55: Data for Annual average trend of SO_2, NOx, and RSPM at Civil Lines Chandrapur

Station Name	Year	Average of SO_2(µg/m³)	Average of NO_X(µg/m³)	Average of RSPM(µg/m³)
Annual Permissible Limit (CPCB)		*50*	*40*	*60*
Civil Lines, Chandrapur	17-18	10	25	125
	18-19	9	23	108

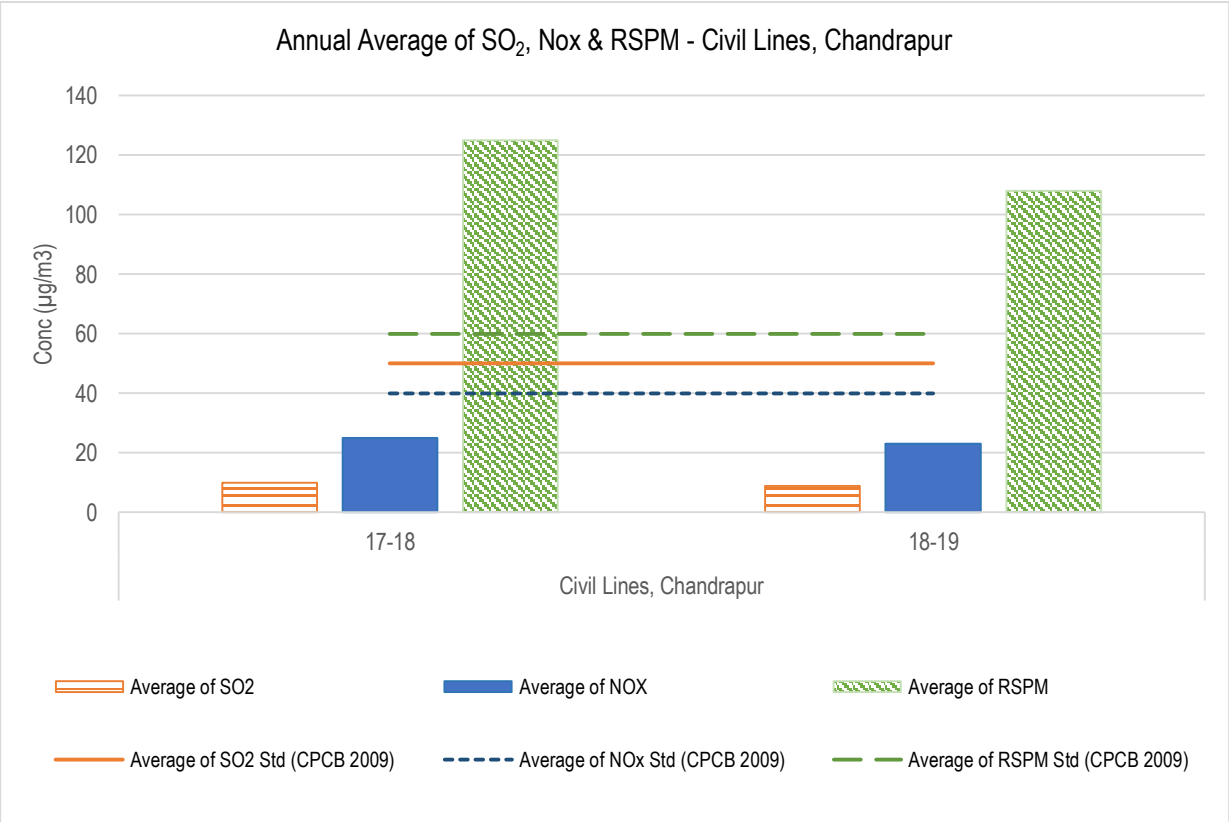
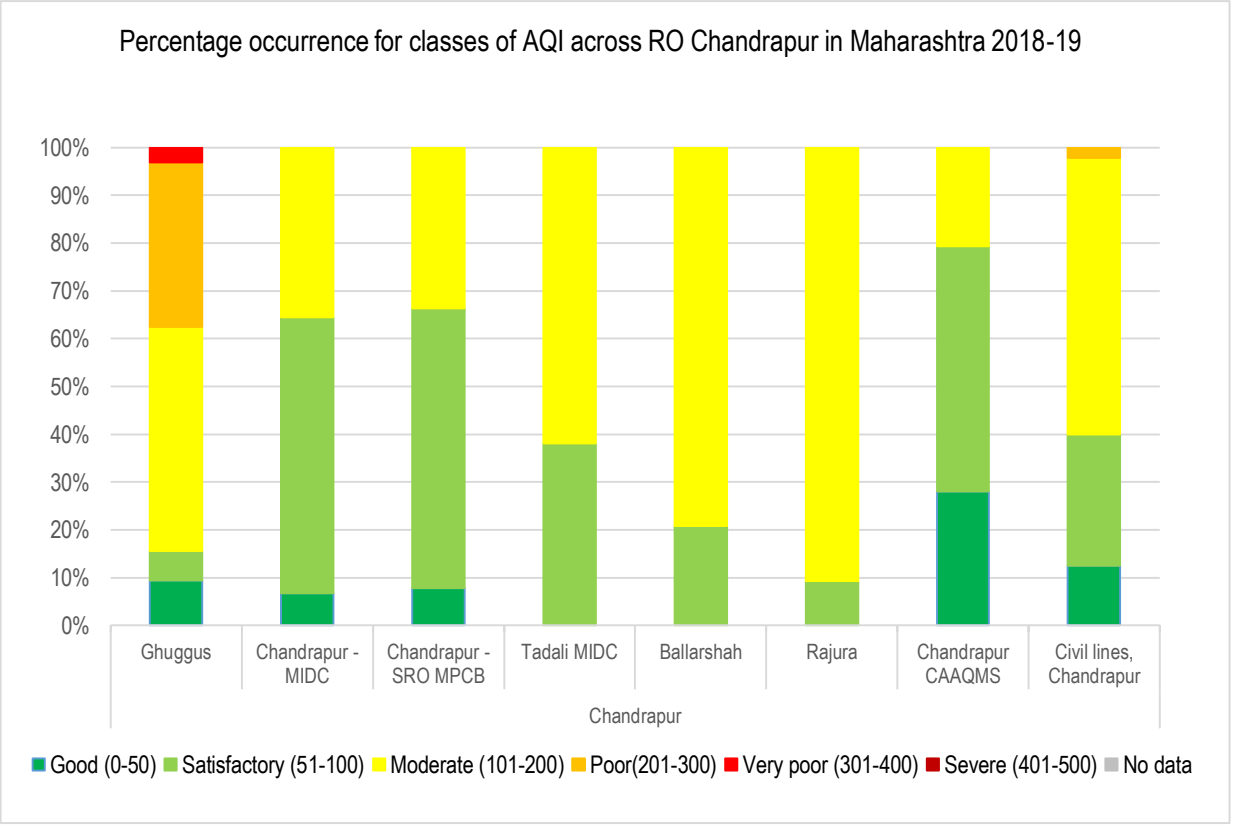


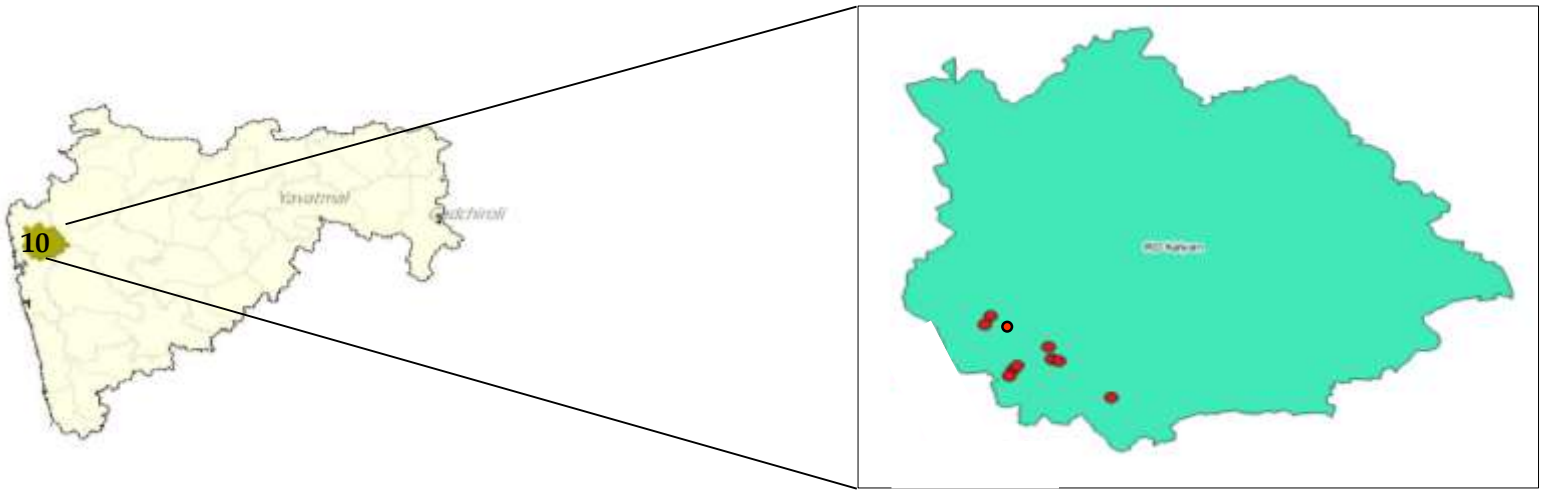
Figure No. 63: Annual average trend of SO_2, NOx, and RSPM at Civil Lines Chandrapur

Table No. 56: Percentage exceedance of pollutants at Chandrapur RO

Station Name	Total Observations	Exceedence			% Exceedence		
		SO_2	NOx	RSPM	SO_2	NOx	RSPM
Ghuggus	98	0	2	29	0	2	91
Chandrapur - MIDC	104	0	9	92	0	9	88
Chandrapur - SRO MPCB	321	0	39	256	0	12	83
Tadali MIDC	98	0	4	90	0	4	98
Ballarshah	100	0	11	95	0	11	99
Rajura	98	0	9	65	0	9	100
Chandrapur	344	0	0	222	0	0	64.53
Civil lines, Chandrapur	360	0	0	297	0	0	82.5



RO - Kalyan



MPCB RO	Region	Station code	Station name	Type	Latitude (deg)	Longitude (deg)
Kalyan	Ambernath	445	Ambernath	Rural and other areas	19° 13' 26.2" N	73° 09' 15.0" E
	Badlapur	649	Badlapur - BIWA House	Rural and other areas	19° 09' 22.2" N	73° 14' 16.0" E
	Bhiwandi		I.G.M. Hospital	Rural and other areas	19° 17' 57.2" N	73° 04' 00.4" E
	Bhiwandi		Prematai hall	Commercial	19° 17' 07.7" N	73° 03' 27.8" E
	Dombivali	265	Dombivali	Industrial	19° 12' 15.8" N	73° 05' 53.9" E
	Dombivali		MIDC Office Dombivali	Industrial	19° 12' 47.0" N	73° 06' 17.4" E
	Dombivali		Dombivali CAAQMS	Industrial	19° 11' 38.38"N	73° 05' 32.35"E
	Kalyan		MPCB RO Kalyan office	Commercial	19° 14' 42.0" N	73° 08' 58.6" E
	Ulhasnagar	647	Smt. CHM College Campus	Rural and other areas	19° 13' 12.4" N	73° 09' 51.3" E
	Ulhasnagar	648	Powai Chowk	Rural and other areas	19° 13' 26.0" N	73° 09' 16.2" E

Ambernath

Table No. 57: Data for Monthly average reading recorded at Ambernath

Station Name	Year	Month	Average of SO_2(µg/m³)	Average of NOx(µg/m³)	Average of RSPM(µg/m³)
Ambernath	2018	Apr	25	63	156
		May	22	62	142
		Jun	22	55	107
		Jul	22	61	73
		Aug	27	39	64
		Sep	22	56	105
		Oct	24	58	142
		Nov	27	73	112
		Dec	28	57	148
	2019	Jan	24	71	143
		Feb	26	48	141
		Mar	29	64	145

Note: Monthly graphs do not have any CPCB Standard[41]

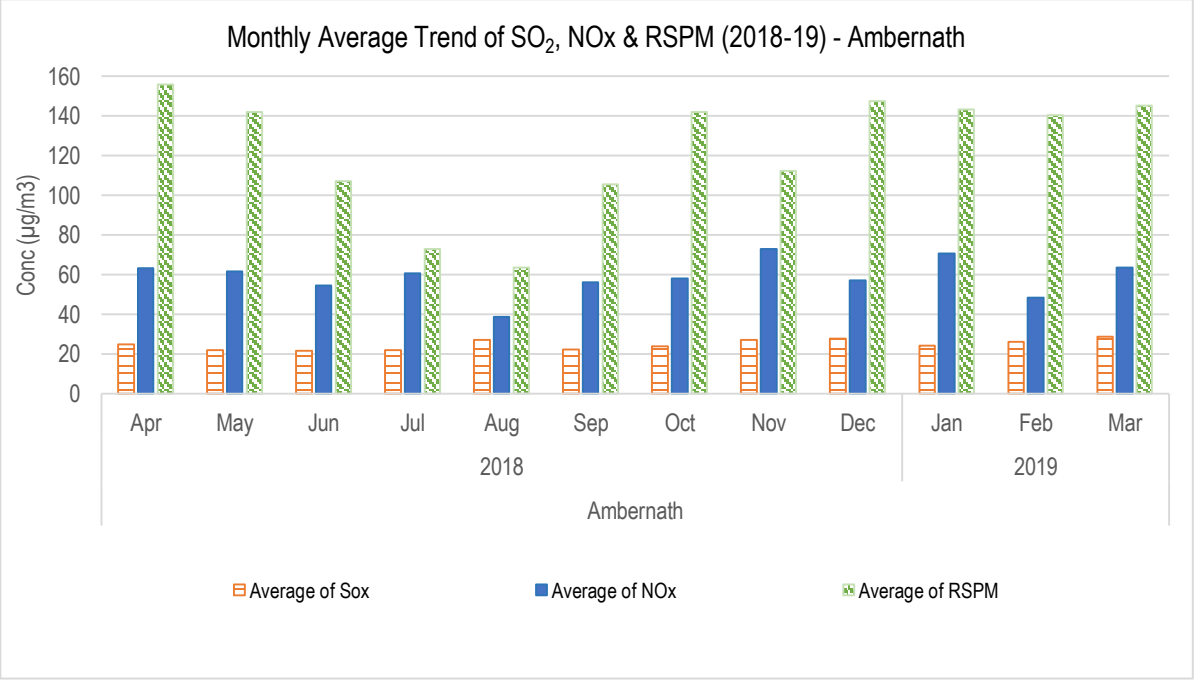


Figure No. 64: Monthly average reading recorded at Ambernath

[41] https://cpcb.nic.in/air-quality-standard/

Table No. 58: Data for Annual average trend of SO_2, NOx, and RSPM at Ambernath

Station Name	Year	Average of SO_2(µg/m³)	Average of NO_X(µg/m³)	Average of RSPM(µg/m³)
Annual Permissible Limit (CPCB)		*50*	*40*	*60*
Ambernath	04-05	31	36	97
	05-06	30	52	83
	06-07	24	44	93
	07-08	31	40	106
	08-09	29	53	70
	12-13	42	91	118
	13-14	31	64	111
	14-15	27	54	101
	15-16	22	58	111
	16-17	26	71	123
	17-18	24	72	259
	18-19	25	58	116

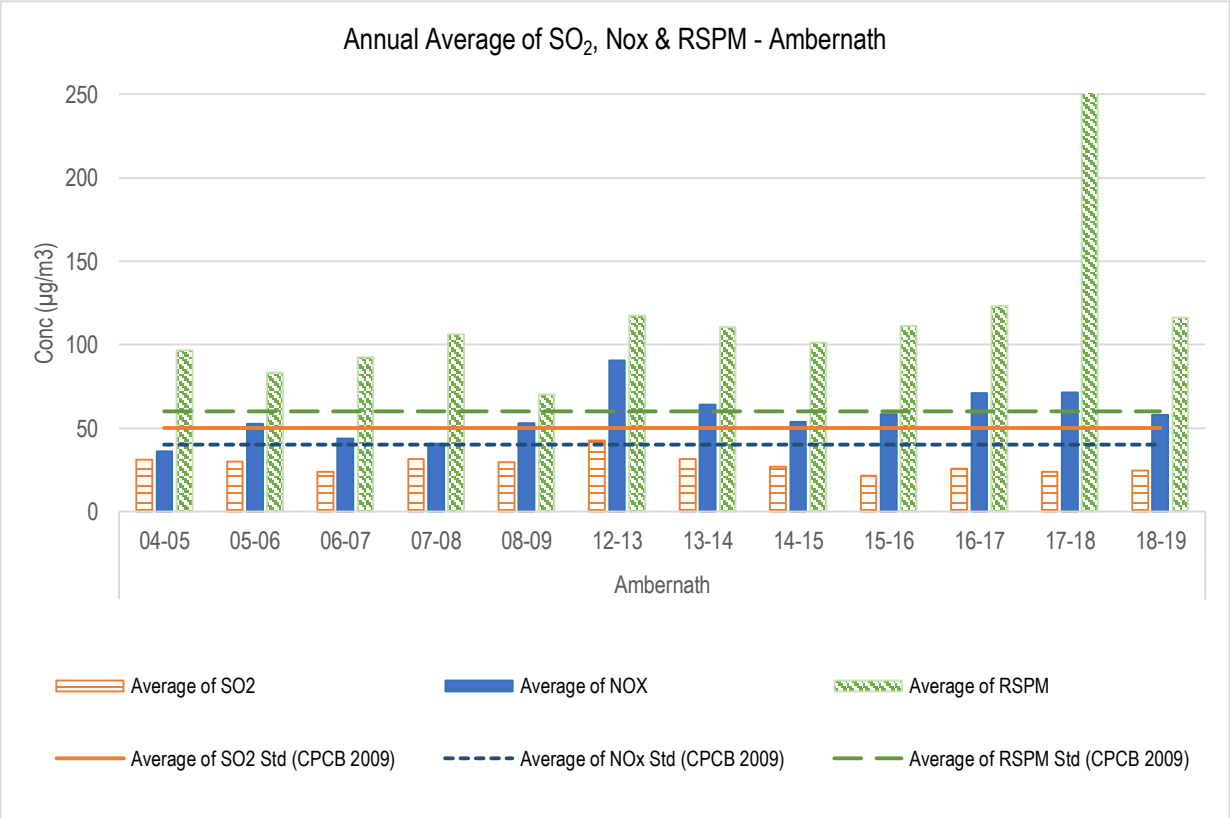


Figure No. 65: Annual average trend of SO_2, NOx, and RSPM at Ambernath

Badlapur - Badlapur - BIWA House

Table No. 59: Data for Monthly average reading recorded at Badlapur - BIWA House

Station Name	Year	Month	Average of SO_2(µg/m³)	Average of NOx(µg/m³)	Average of RSPM(µg/m³)
Badlapur - BIWA House	2018	Apr	25	62	134
		May	23	60	137
		Jun	21	60	105
		Jul	23	64	74
		Aug	27	48	90
		Sep	25	58	97
		Oct	23	46	130
		Nov	25	67	125
		Dec	23	69	146
	2019	Jan	25	68	152
		Feb	27	59	135
		Mar	28	62	120

Note: Monthly graphs do not have any CPCB Standard[42]

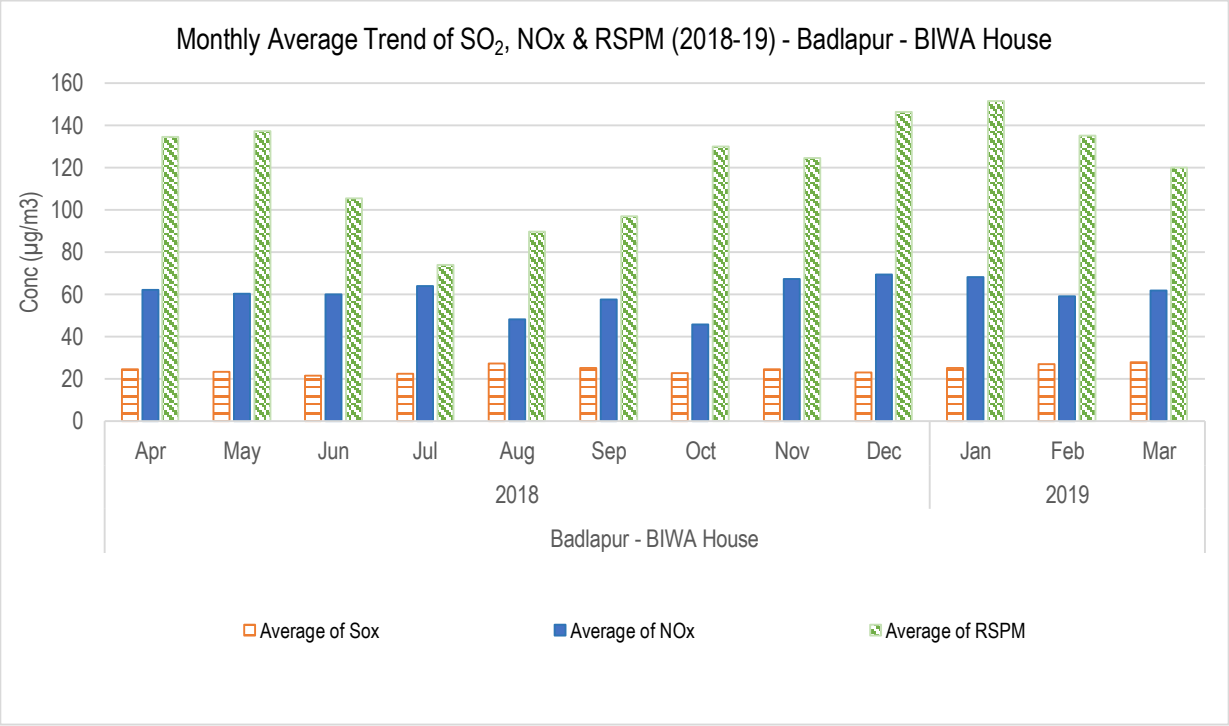


Figure No. 66: Monthly average reading recorded at Badlapur - BIWA House

[42] https://cpcb.nic.in/air-quality-standard/

Table No. 60: Data for Annual average trend of SO_2, NOx, and RSPM at Badlapur - BIWA House

Station Name	Year	Average of SO_2(µg/m³)	Average of NO_X(µg/m³)	Average of RSPM(µg/m³)
Annual Permissible Limit (CPCB)		***50***	***40***	***60***
Badlapur - BIWA House	06-07	27	39	141
	07-08	30	42	93
	08-09	35	76	98
	09-10	55	85	103
	10-11	36	74	118
	11-12	41	68	121
	12-13	41	69	100
	13-14	35	49	96
	14-15	29	51	101
	15-16	23	61	113
	16-17	25	68	120
	17-18	31	73	239
	18-19	24	58	111

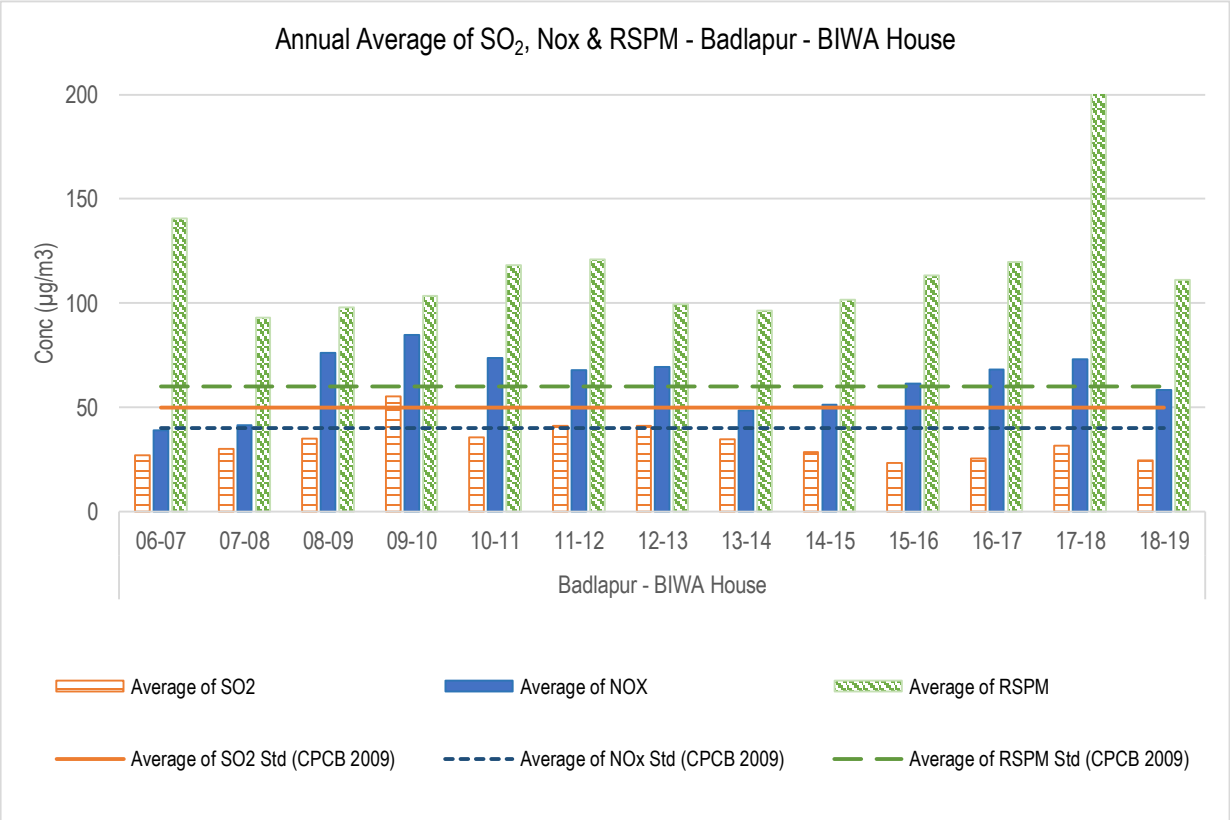


Figure No. 67: Annual average trend of SO_2, NOx, and RSPM at Badlapur - BIWA House

Bhiwandi - IGM Hospital

Table No. 61: Data for Monthly average reading recorded at IGM Hospital - Bhiwandi

Station Name	Year	Month	Average of SO_2(µg/m³)	Average of NOx(µg/m³)	Average of RSPM(µg/m³)
I.G.M. Hospital	2018	Apr	34	44	67
		May	35	45	66
		Jun	32	45	66
		Jul	32	44	80
		Aug	36	51	67
		Sep	34	44	67
		Oct	28	43	76
		Nov	35	44	67
		Dec	29	43	76
	2019	Jan	29	43	76
		Feb	34	44	67
		Mar	34	44	67

Note: Monthly graphs do not have any CPCB Standard[43]

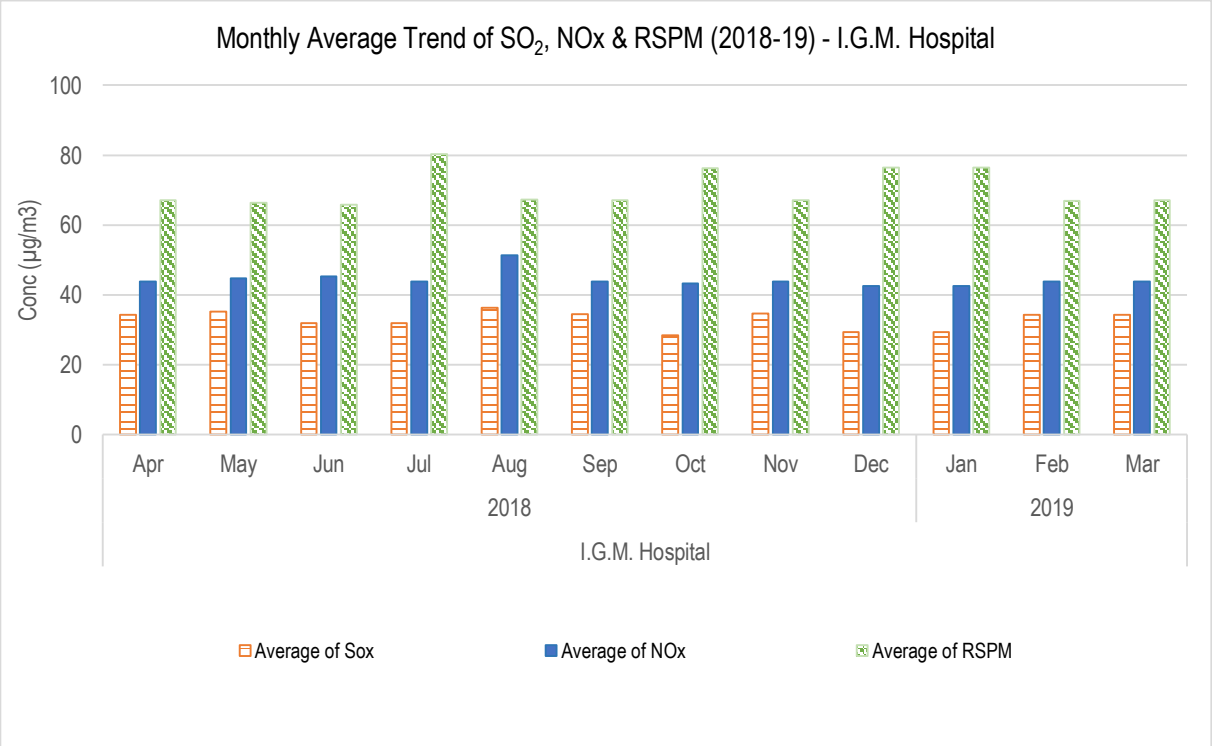


Figure No. 68: Monthly average reading recorded at IGM Hospital - Bhiwandi

[43] https://cpcb.nic.in/air-quality-standard/

Table No. 62: Data for Annual average trend of SO_2, NOx, and RSPM at IGM Hospital - Bhiwandi

Station Name	Year	Average of SO_2(µg/m³)	Average of NO_X(µg/m³)	Average of RSPM(µg/m³)
Annual permissible Limit (CPCB)		***50***	***40***	***60***
I.G.M. Hospital	11-12	23	29	62
	12-13	26	35	63
	13-14	30	40	72
	14-15	32	42	72
	15-16	34	43	73
	16-17	33	45	71
	17-18	31	42	68
	18-19	33	44	70

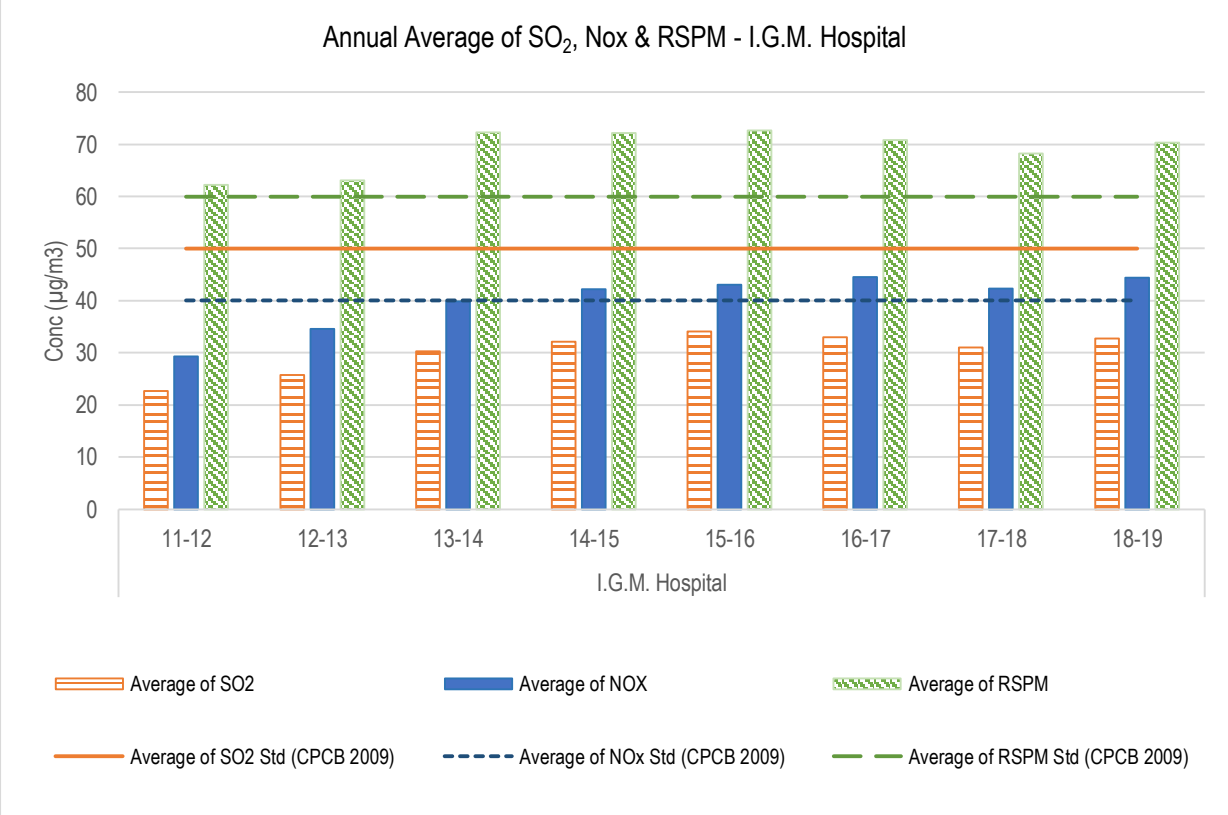


Figure No. 69: Annual average trend of SO_2, NOx, and RSPM at IGM Hospital - Bhiwandi

Bhiwandi - Prematai Hall

Table No. 63: Data for Monthly average reading recorded at Prematai Hall - Bhiwandi

Station Name	Year	Month	Average of SO_2(µg/m³)	Average of NOx(µg/m³)	Average of RSPM(µg/m³)
Prematai hall	2018	Apr	35	43	66
		May	43	44	72
		Jun	30	43	63
		Jul	30	43	76
		Aug	34	46	66
		Sep	34	47	66
		Oct	35	44	66
		Nov	35	43	66
		Dec	35	43	66
	2019	Jan	35	43	66
		Feb	35	43	66
		Mar	40	65	66

Note: Monthly graphs do not have any CPCB Standard[44]

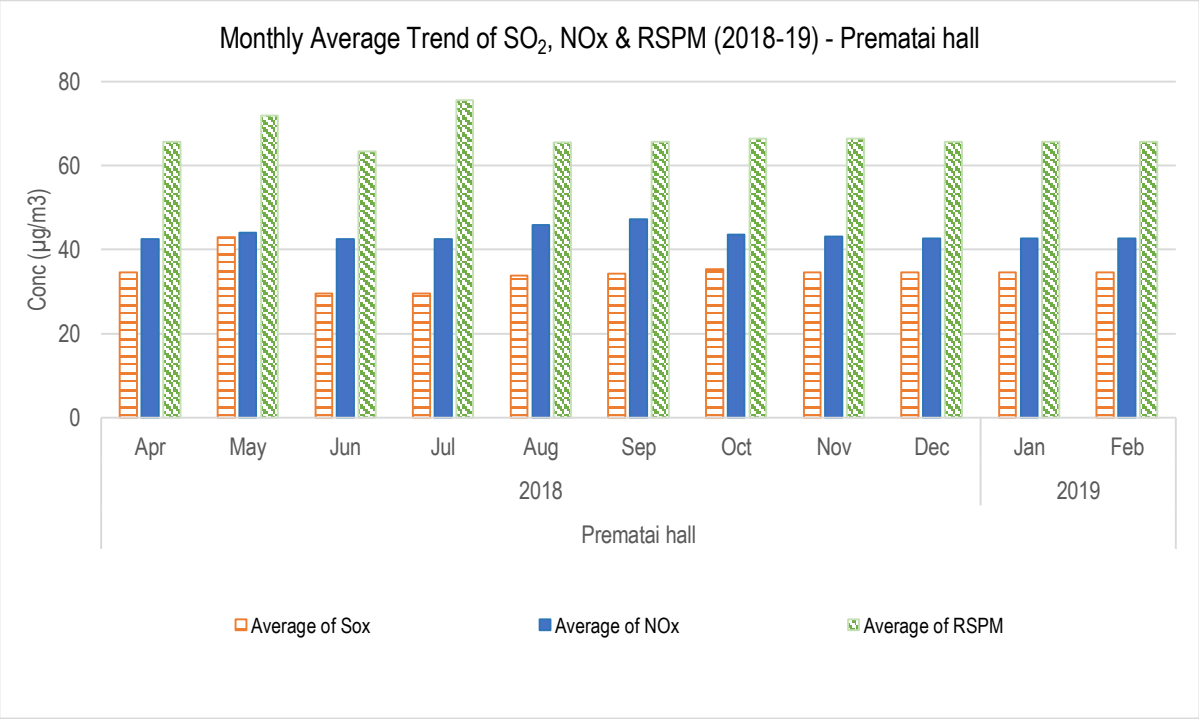


Figure No. 70: Monthly average reading recorded at Prematai Hall - Bhiwandi
Note: Data for the month of March is not available

[44] https://cpcb.nic.in/air-quality-standard/

Table No. 64: Data for Annual average trend of SO_2, NOx, and RSPM at Prematai Hall - Bhiwandi

Station Name	Year	Average of SO_2(µg/m³)	Average of NO_X(µg/m³)	Average of RSPM(µg/m³)
Annual Permissible Limit (CPCB)		***50***	***40***	***60***
Prematai hall	11-12	15	23	52
	12-13	24	33	59
	13-14	29	38	66
	14-15	32	42	71
	15-16	34	44	72
	16-17	33	42	70
	17-18	34	43	66
	18-19	33	45	67

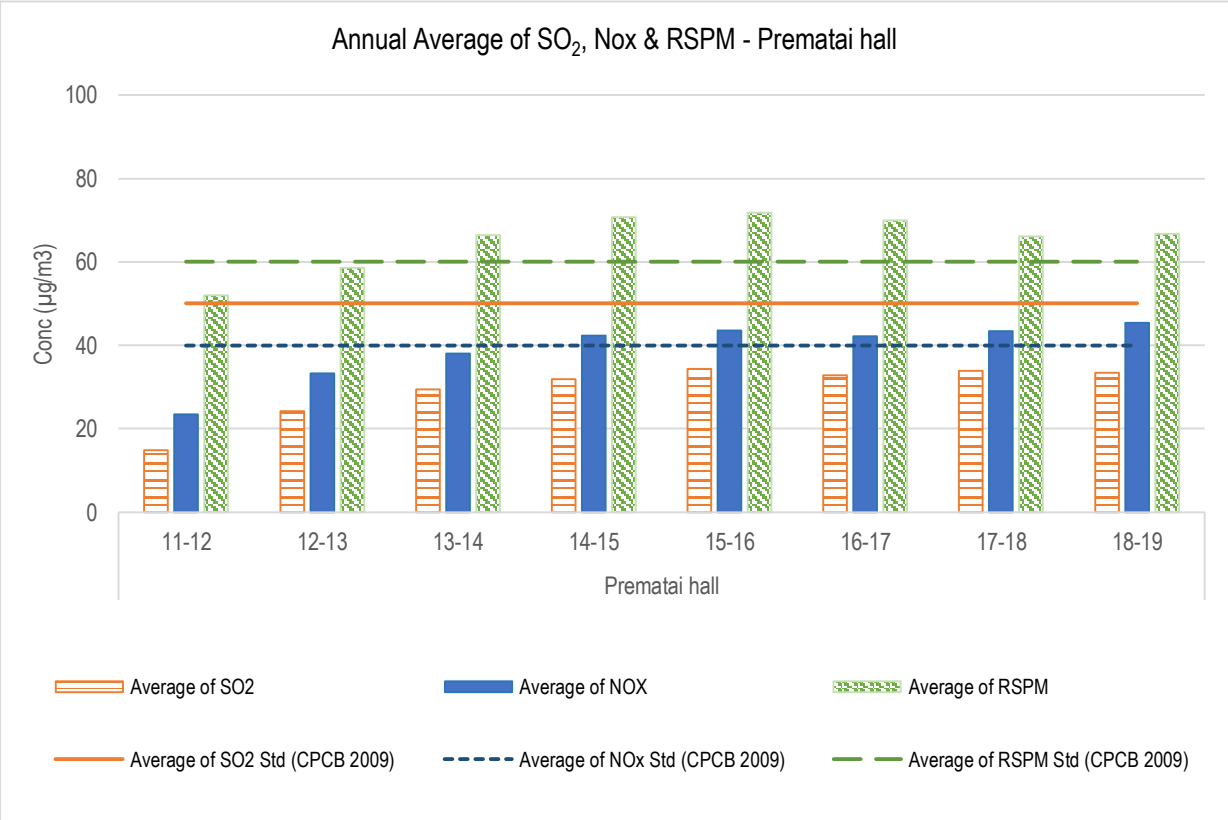


Figure No. 71: Annual average trend of SO_2, NOx, and RSPM at Prematai Hall - Bhiwandi

Dombivali

Table No. 65: Data for Monthly average reading recorded at Dombivali

Station Name	Year	Month	Average of SO_2(µg/m³)	Average of NOx(µg/m³)	Average of RSPM(µg/m³)
Dombivali	2018	Apr	21	69	154
		May	26	59	146
		Jun	22	54	114
		Jul	24	70	96
		Aug	30	48	139
		Sep	26	58	101
		Oct	23	45	122
		Nov	29	51	121
		Dec	34	60	143
	2019	Jan	27	62	124
		Feb	31	49	158
		Mar	25	65	122

Note: Monthly graphs do not have any CPCB Standard[45]

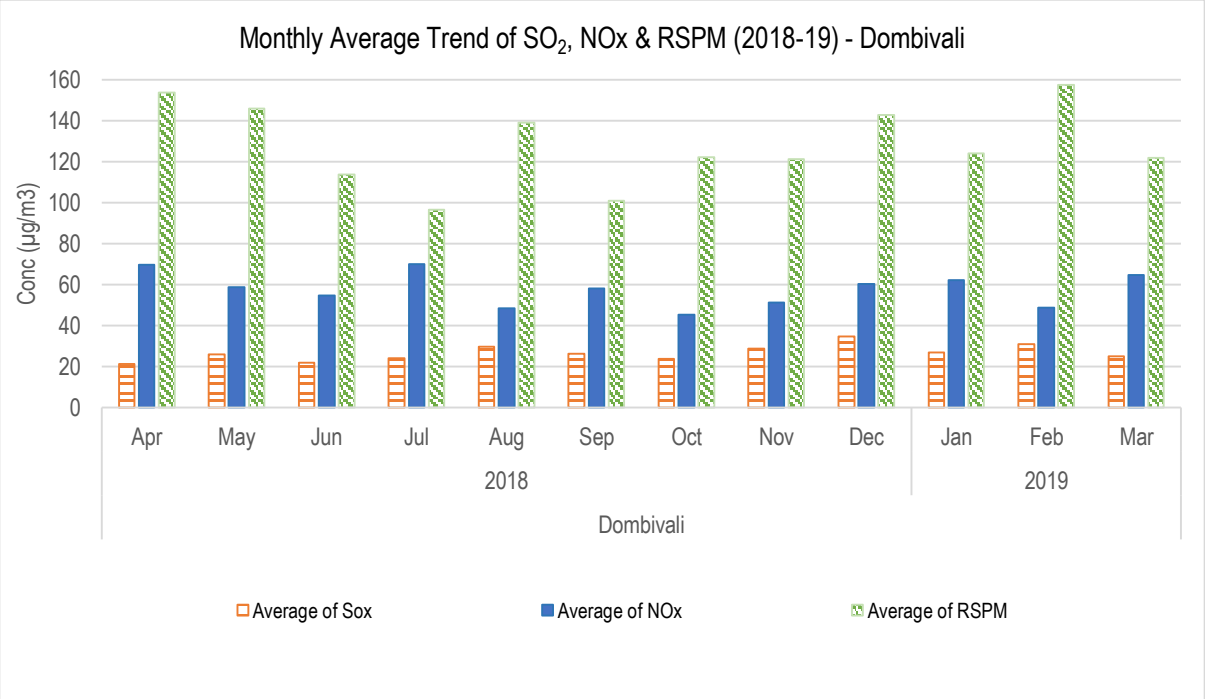


Figure No. 72: Monthly average reading recorded at Dombivali

[45] https://cpcb.nic.in/air-quality-standard/

Table No. 66: Data for Annual average trend of SO_2, NOx, and RSPM at Dombivali

Station Name	Year	Average of SO_2(µg/m³)	Average of NO_X(µg/m³)	Average of RSPM(µg/m³)
Annual Permissible Limit (CPCB)		***50***	***40***	***60***
Dombivali	04-05	42	38	71
	05-06	35	52	109
	06-07	24	38	120
	07-08	37	41	98
	08-09	34	55	68
	12-13	50	94	123
	13-14	35	66	111
	14-15	29	62	111
	15-16	23	58	112
	16-17	27	70	112
	17-18	26	77	248
	18-19	26	56	124

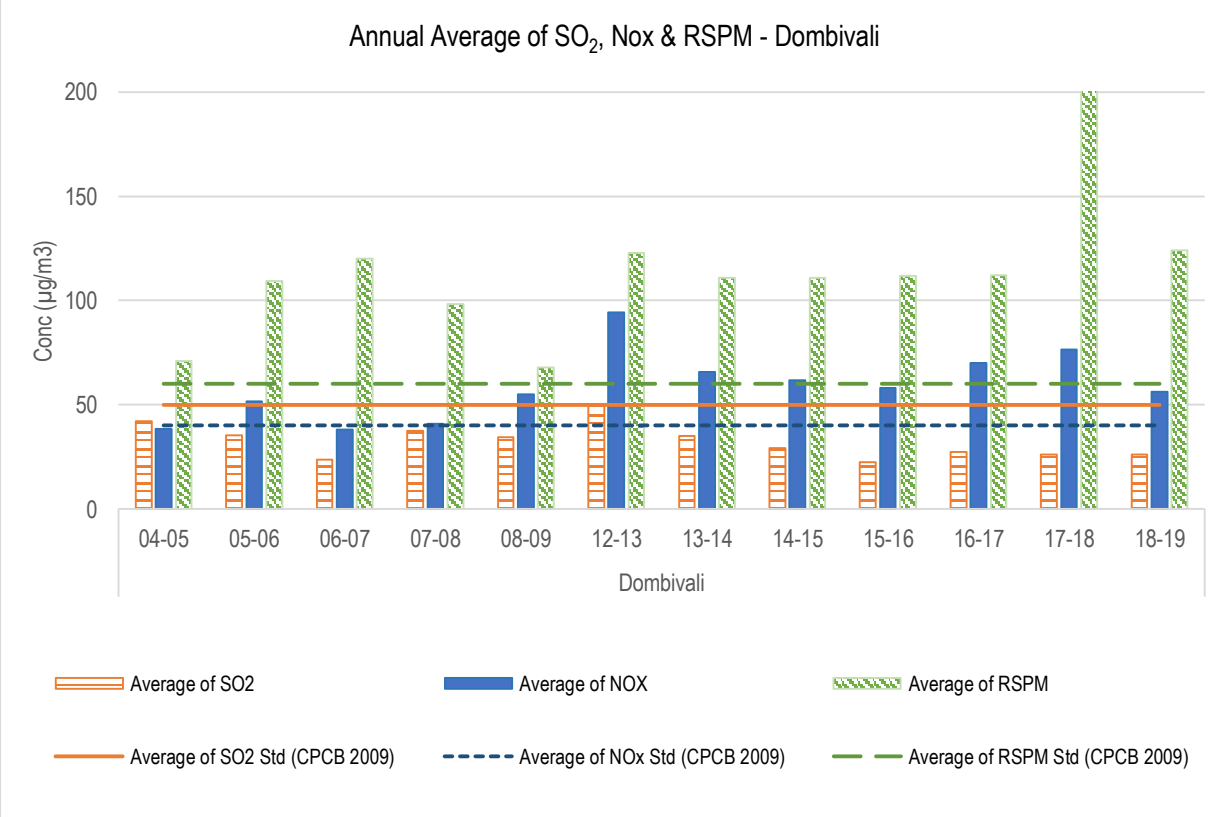


Figure No. 73: Annual average trend of SO_2, NOx, and RSPM at Dombivali

Dombivali - MIDC Office Dombivali

Table No. 67: Data for Monthly average reading recorded at MIDC Office - Dombivali

Station Name	Year	Month	Average of SO_2(µg/m³)	Average of NOx(µg/m³)	Average of RSPM(µg/m³)
MIDC Office Dombivali	2018	Apr	22	58	143
		May	26	55	132
		Jun	22	54	111
		Jul	23	83	83
		Aug	29	59	90
		Sep	29	72	106
		Oct	22	55	160
		Nov	27	78	126
		Dec	30	55	152
	2019	Jan	29	69	135
		Feb	29	53	138
		Mar	29	72	122

Note: Monthly graphs do not have any CPCB Standard[46]

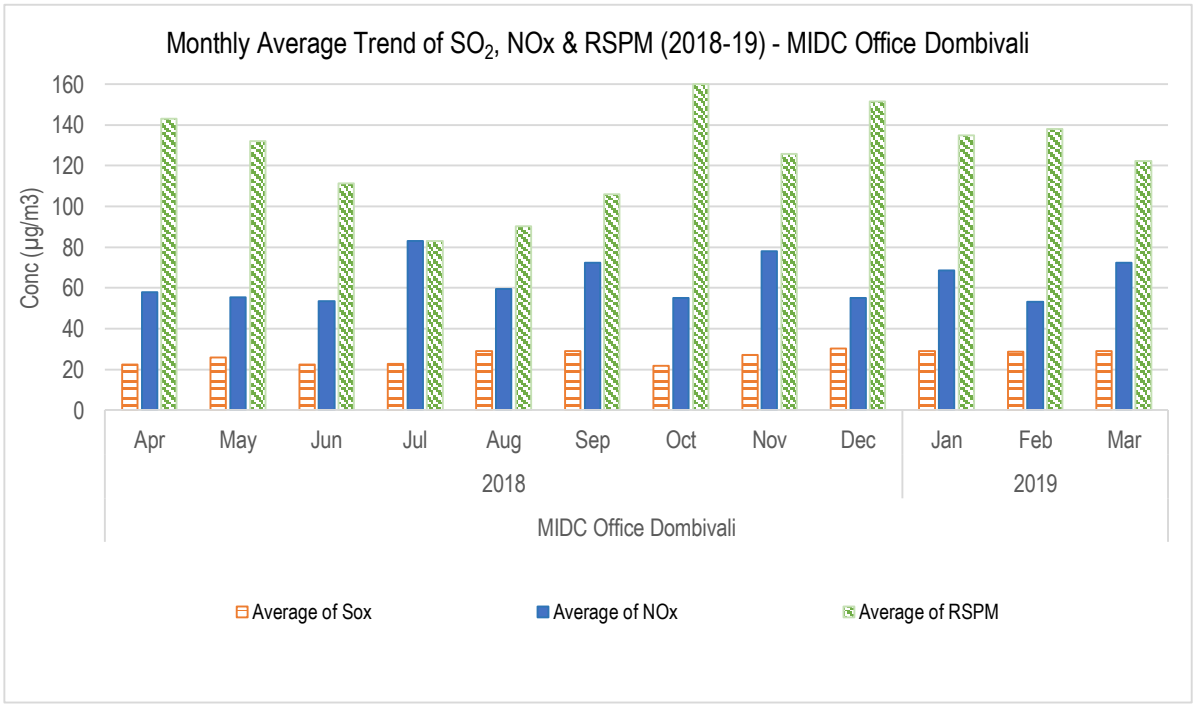


Figure No. 74: Monthly average reading recorded at MIDC Office - Dombivali

[46] https://cpcb.nic.in/air-quality-standard/

Table No. 68: Data for Annual average trend of SO_2, NOx, and RSPM at MIDC Office - Dombivali

Station Name	Year	Average of SO_2(µg/m³)	Average of NO_X(µg/m³)	Average of RSPM(µg/m³)
Annual Permissible Limit (CPCB)		***50***	***40***	***60***
MIDC Office Dombivali	12-13	37	61	86
	13-14	32	62	109
	14-15	29	67	124
	15-16	21	58	110
	16-17	26	69	120
	17-18	24	73	213
	18-19	26	59	120

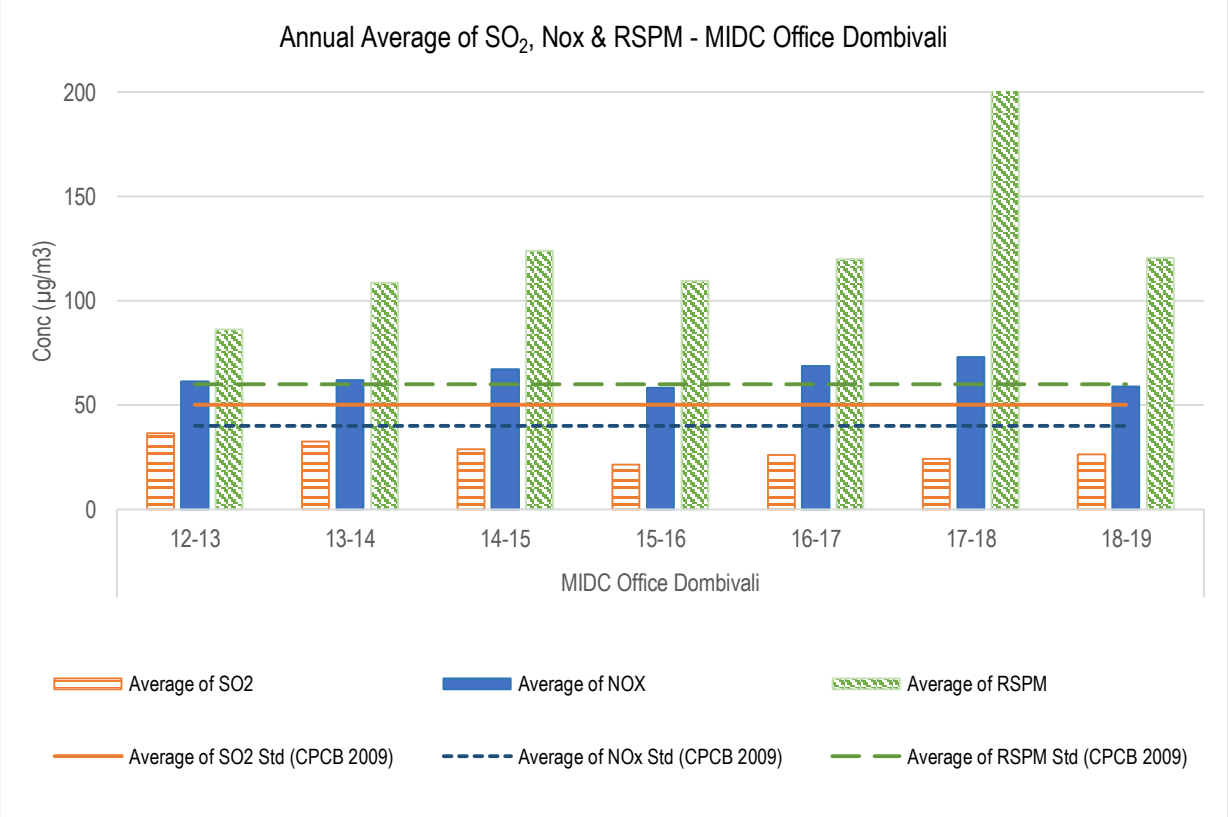


Figure No. 75: Annual average trend of SO_2, NOx, and RSPM at MIDC Office - Dombivali

Dombivali - Dombivali CAAQMS

Table No. 69: Data for Monthly average reading recorded at Dombivali CAAQMS

Station Name	Year	Month	Average of SO_2(µg/m³)	Average of NOx(µg/m³)	Average of RSPM(µg/m³)
Dombivali CAAQMS	2018	Apr	8	58	118
		May	8	31	75
		Jun	6	15	55
		Jul	20	12	42
		Aug	20	56	36
		Sep	15	33	54
		Oct	24	41	73
		Nov	24	59	134
		Dec	49	63	172
	2019	Jan	37	55	204
		Feb	31	43	176
		Mar	28	27	134

Note: Monthly graphs do not have any CPCB Standard[47]

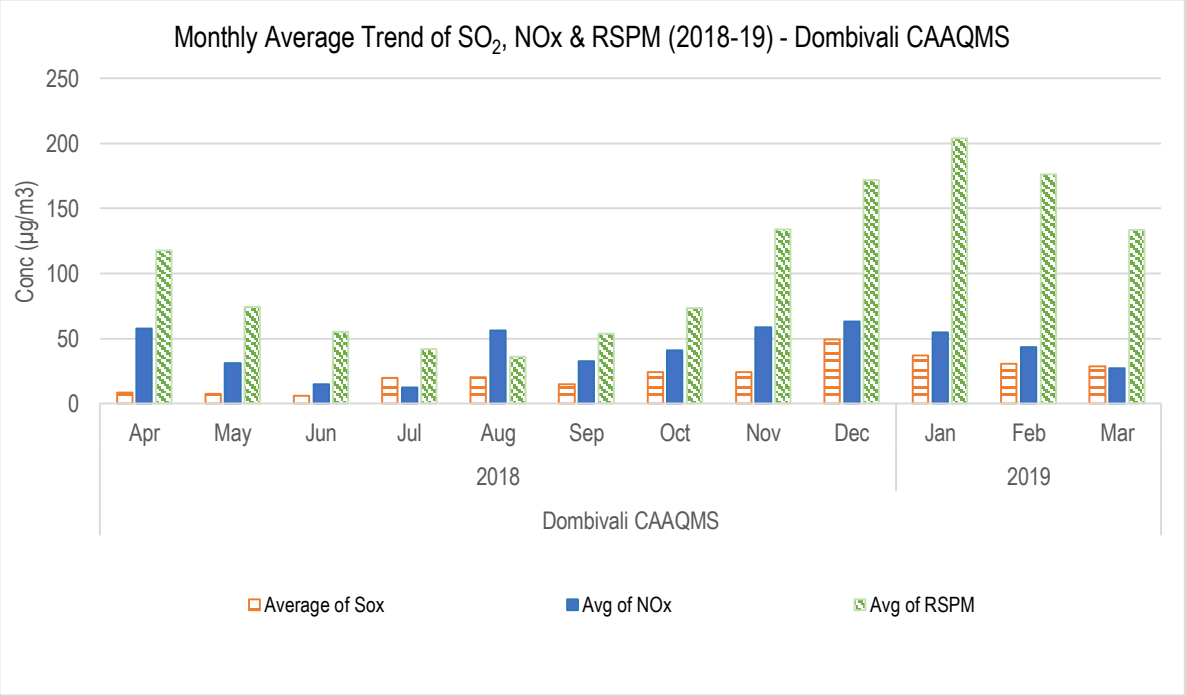


Figure No. 76: Monthly average reading recorded at Dombivali CAAQMS

[47] https://cpcb.nic.in/air-quality-standard/

Table No. 70: Data for Annual average trend of SO_2, NOx, and RSPM at Dombivali CAAQMS

Station Name	Year	Average of SO_2(µg/m³)	Average of NO_X(µg/m³)	Average of RSPM(µg/m³)
Annual Permissible Limit (CPCB)		*50*	*40*	*60*
Dombivali CAAQMS	16-17	21	31	84
	17-18	21	66	64
	18-19	22	42	108

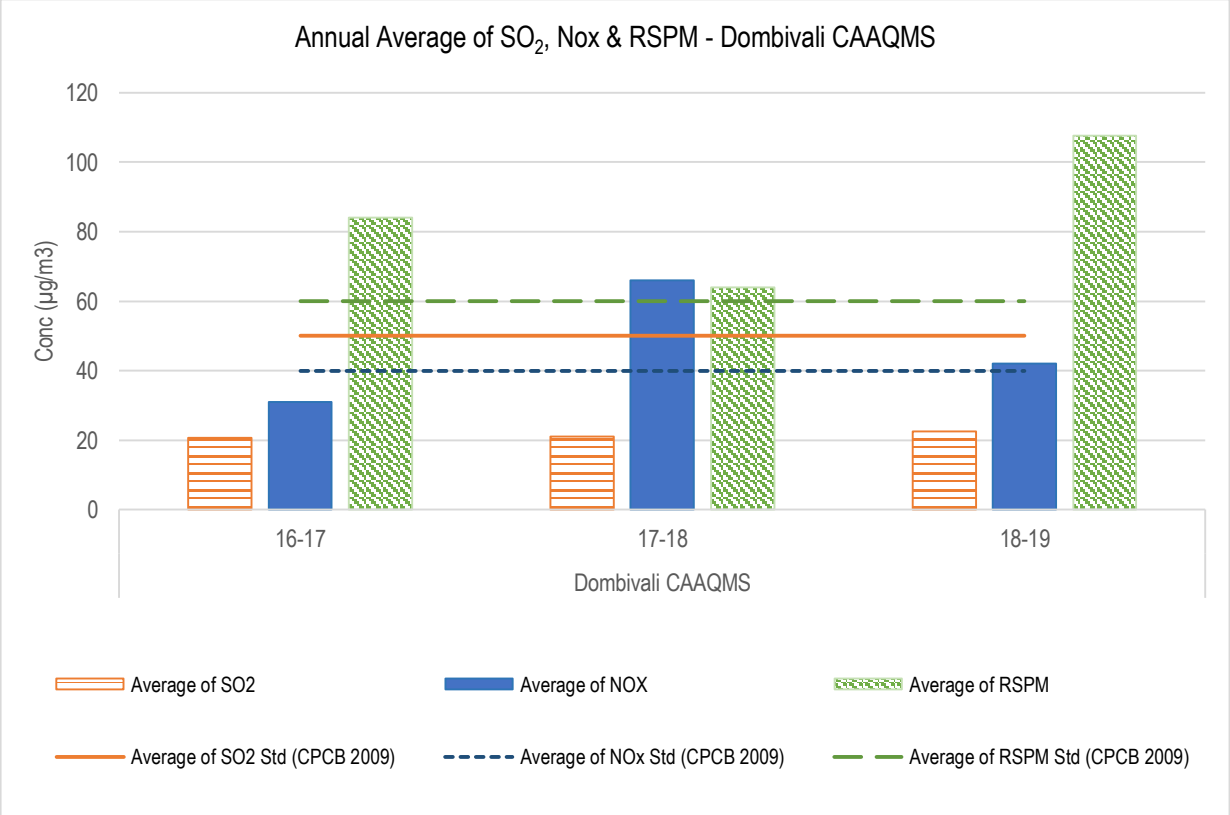


Figure No. 77: Annual average trend of SO_2, NOx, and RSPM at Dombivali CAAQMS

Kalyan - MPCB RO Kalyan Office

Table No. 71: Data for Monthly average reading recorded at MPCB RO Kalyan Office

Station Name	Year	Month	Average of SO_2(µg/m³)	Average of NOx(µg/m³)	Average of RSPM(µg/m³)
MPCB RO Kalyan office	2018	Apr	32	36	69
		May	34	41	68
		Jun	28	47	68
		Jul	32	44	80
		Aug	35	46	67
		Sep	27	36	68
		Oct	24	39	68
		Nov	29	43	68
		Dec	24	37	68
	2019	Jan	24	37	68
		Feb	27	37	68
		Mar	29	42	27

Note: Monthly graphs do not have any CPCB Standard[48]

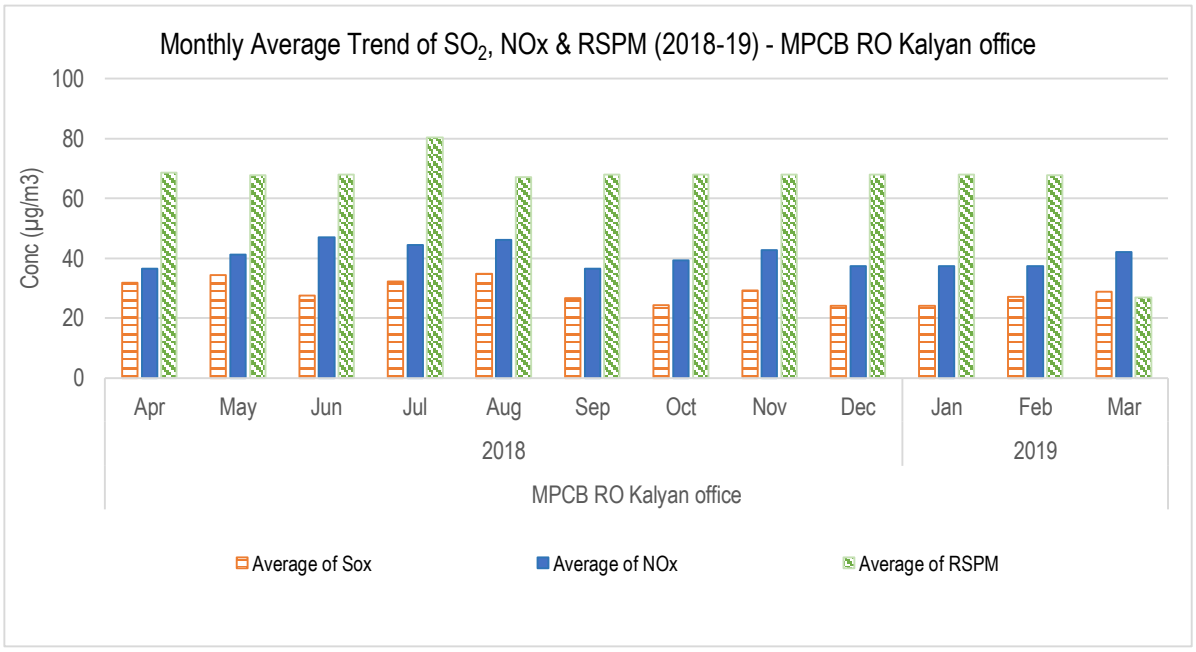


Figure No. 78: Monthly average reading recorded at MPCB RO Kalyan Office

[48] https://cpcb.nic.in/air-quality-standard/

Table No. 72: Data for Annual average trend of SO_2, NOx, and RSPM at MPCB RO Kalyan Office

Station Name	Year	Average of SO_2(µg/m³)	Average of NO_X(µg/m³)	Average of RSPM(µg/m³)
Annual Permissible Limit (CPCB)		*50*	*40*	*60*
MPCB RO Kalyan office	11-12	22	34	71
	12-13	29	38	65
	13-14	30	38	69
	14-15	30	37	71
	15-16	32	40	71
	16-17	33	41	69
	17-18	31	41	69
	18-19	29	41	65

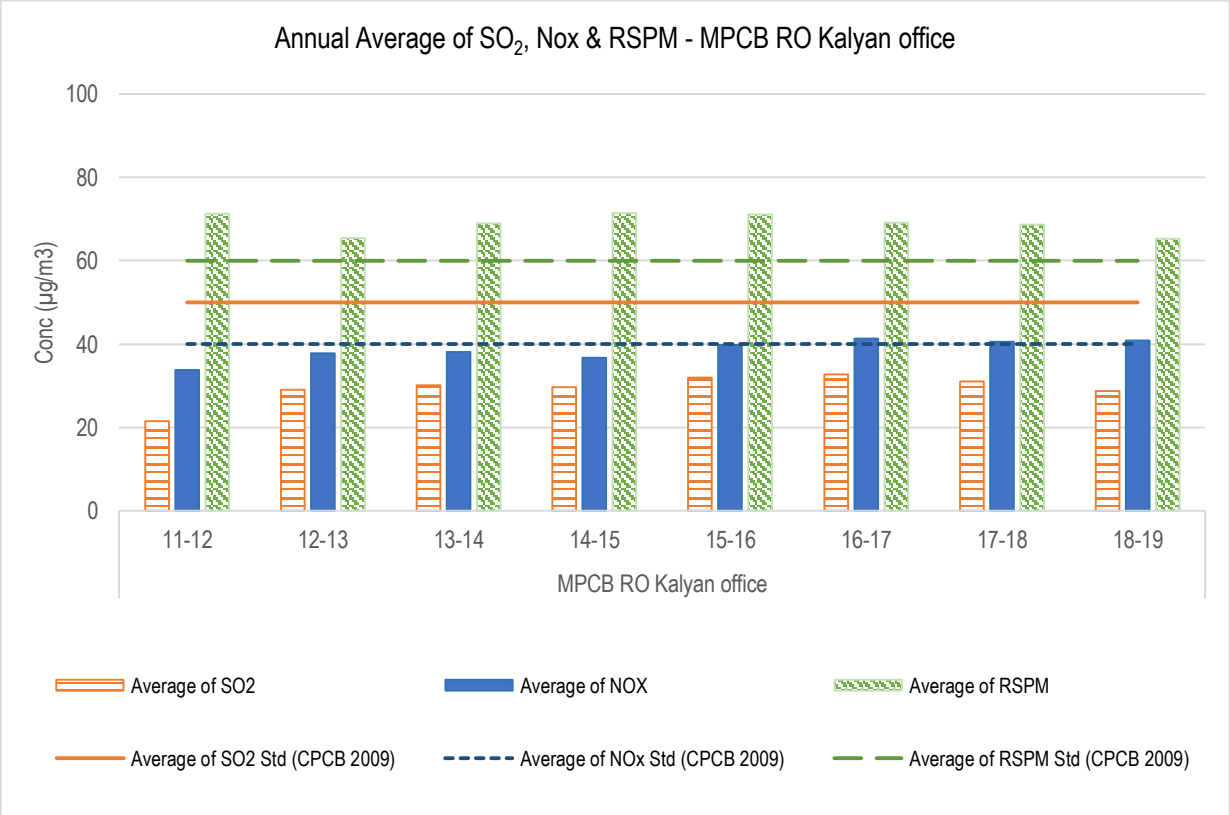


Figure No. 79: Annual average trend of SO_2, NOx, and RSPM at MPCB RO Kalyan Office

Ulhasnagar - Smt. CHM College Campus

Table No. 73: Data for Monthly average reading recorded at Smt. CHM College Campus, Ulhasnagar

Station Name	Year	Month	Average of SO_2(µg/m³)	Average of NOx(µg/m³)	Average of RSPM(µg/m³)
Smt. CHM College Campus	2018	Apr	21	61	96
		May	17	51	99
		Jun	18	44	78
		Jul	17	63	72
		Aug	22	38	62
		Sep	23	37	84
		Oct	19	42	90
		Nov	24	60	115
		Dec	20	56	122
	2019	Jan	20	65	122
		Feb	22	48	107
		Mar	18	58	96

Note: Monthly graphs do not have any CPCB Standard[49]

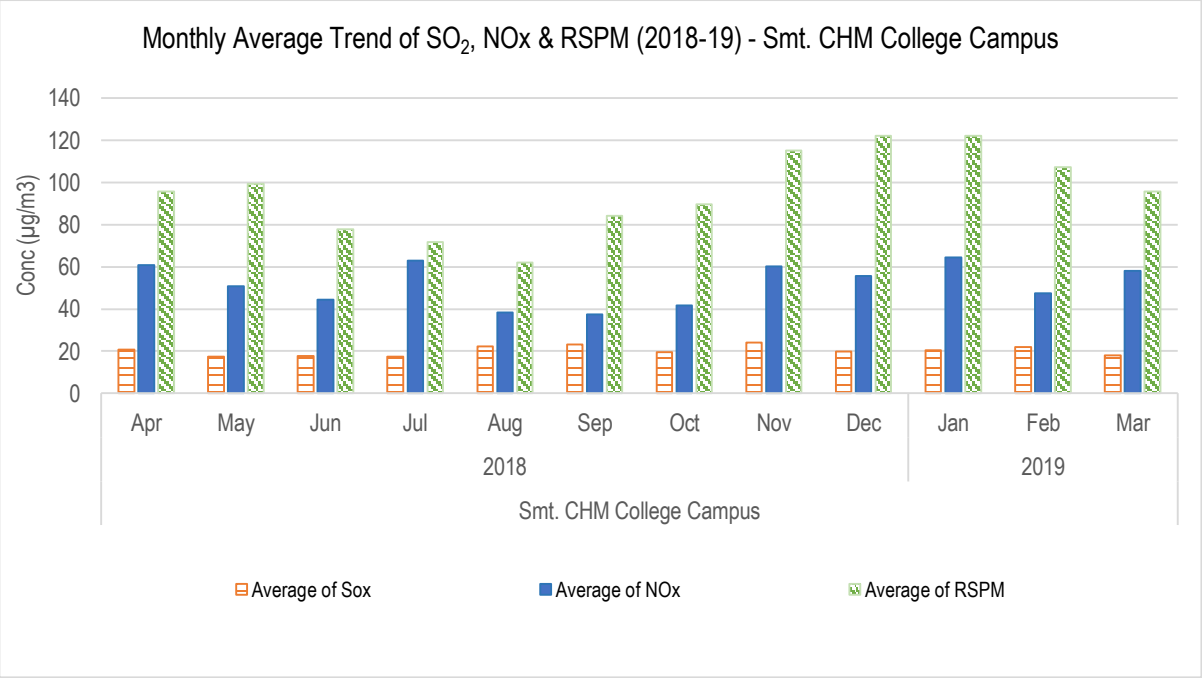


Figure No. 80: Monthly average reading recorded at Smt. CHM College Campus, Ulhasnagar

[49] https://cpcb.nic.in/air-quality-standard/

Table No. 74: Data for Annual average trend of SO_2, NOx, and RSPM at Smt. CHM College Campus, Ulhasnagar

Station Name	Year	Average of SO_2(µg/m³)	Average of NO_X(µg/m³)	Average of RSPM(µg/m³)
Annual Permissible Limit (CPCB)		***50***	***40***	***60***
Smt. CHM College Campus	06-07	28	46	159
	07-08	31	42	90
	08-09	30	57	87
	09-10	46	70	92
	10-11	30	61	99
	11-12	37	64	109
	12-13	34	58	85
	13-14	25	37	68
	14-15	22	42	82
	15-16	22	59	109
	16-17	23	62	110
	17-18	21	63	147
	18-19	20	52	95

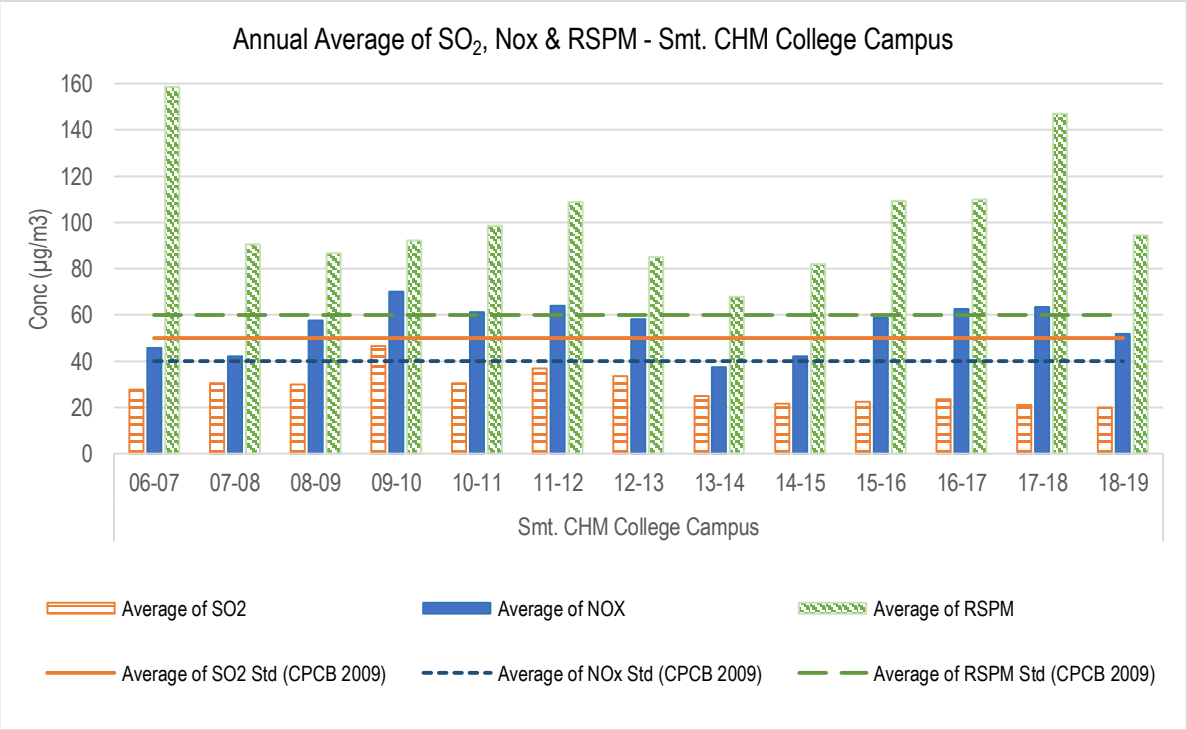


Figure No. 81: Annual average trend of SO_2, NOx, and RSPM at Smt. CHM College Campus, Ulhasnagar

Ulhasnagar - Powai Chowk

Table No. 75: Data for Monthly average reading recorded at Powai Chowk - Ulhasnagar

Station Name	Year	Month	Average of SO_2(µg/m³)	Average of NOx(µg/m³)	Average of RSPM(µg/m³)
Powai Chowk	2018	Apr	24	64	168
		May	24	64	133
		Jun	24	62	132
		Jul	23	69	94
		Aug	27	42	78
		Sep	28	41	117
		Oct	22	48	112
		Nov	28	40	122
		Dec	24	60	135
	2019	Jan	24	56	127
		Feb	26	44	97
		Mar	28	66	103

Note: Monthly graphs do not have any CPCB Standard[50]

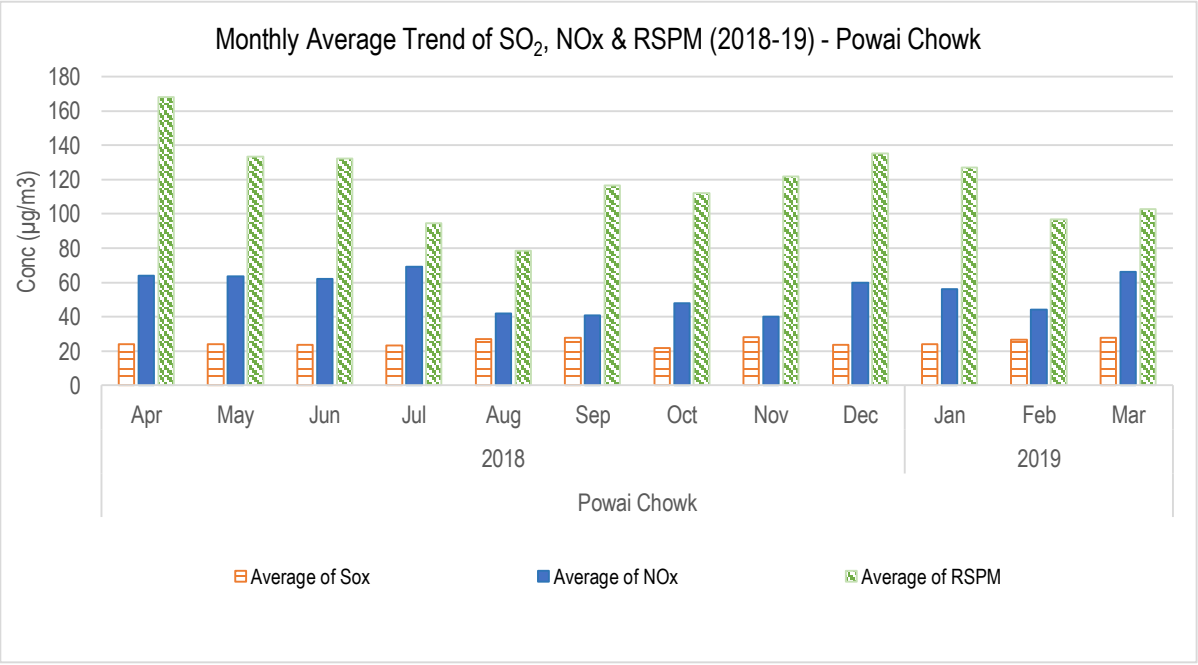


Figure No. 82: Monthly average reading recorded at Powai Chowk - Ulhasnagar

[50] https://cpcb.nic.in/air-quality-standard/

Table No. 76: Data for Annual average trend of SO_2, NOx, and RSPM at Powai Chowk - Ulhasnagar

Station Name	Year	Average of SO2	Average of NOX	Average of RSPM
Annual Permissible Limit (CPCB)		*50*	*40*	*60*
Powai Chowk	06-07	24	38	121
	07-08	25	37	91
	08-09	33	69	95
	09-10	53	96	119
	10-11	31	69	114
	11-12	43	74	122
	12-13	43	81	106
	13-14	33	58	99
	14-15	30	57	106
	15-16	25	67	126
	16-17	27	67	108
	17-18	28	78	240
	18-19	25	54	114

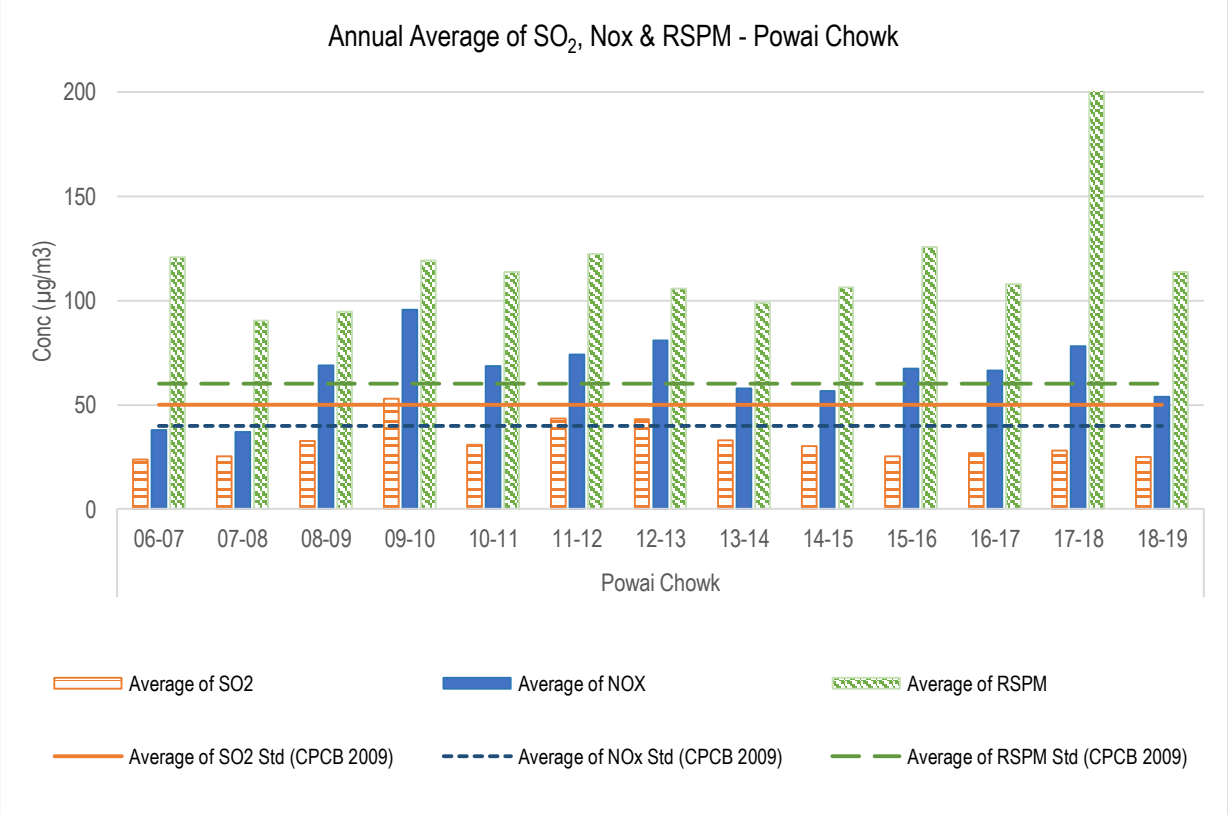
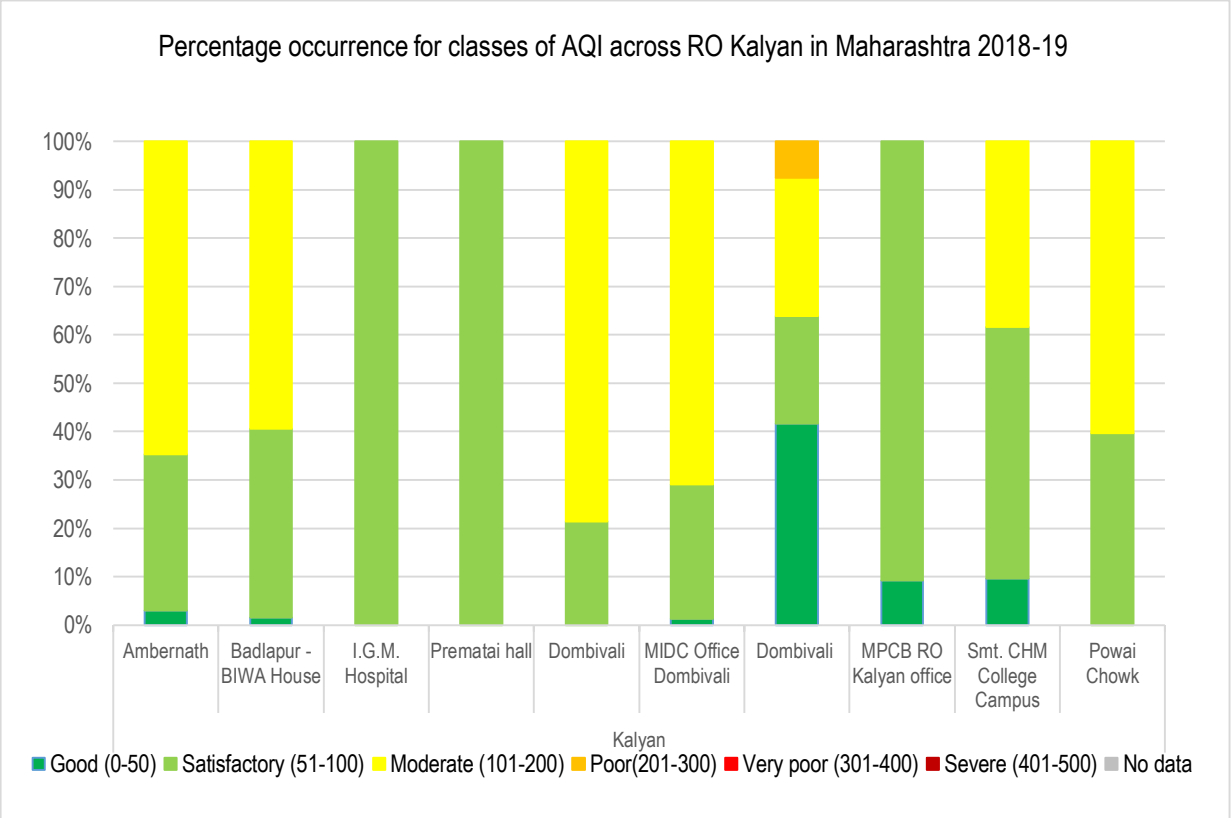


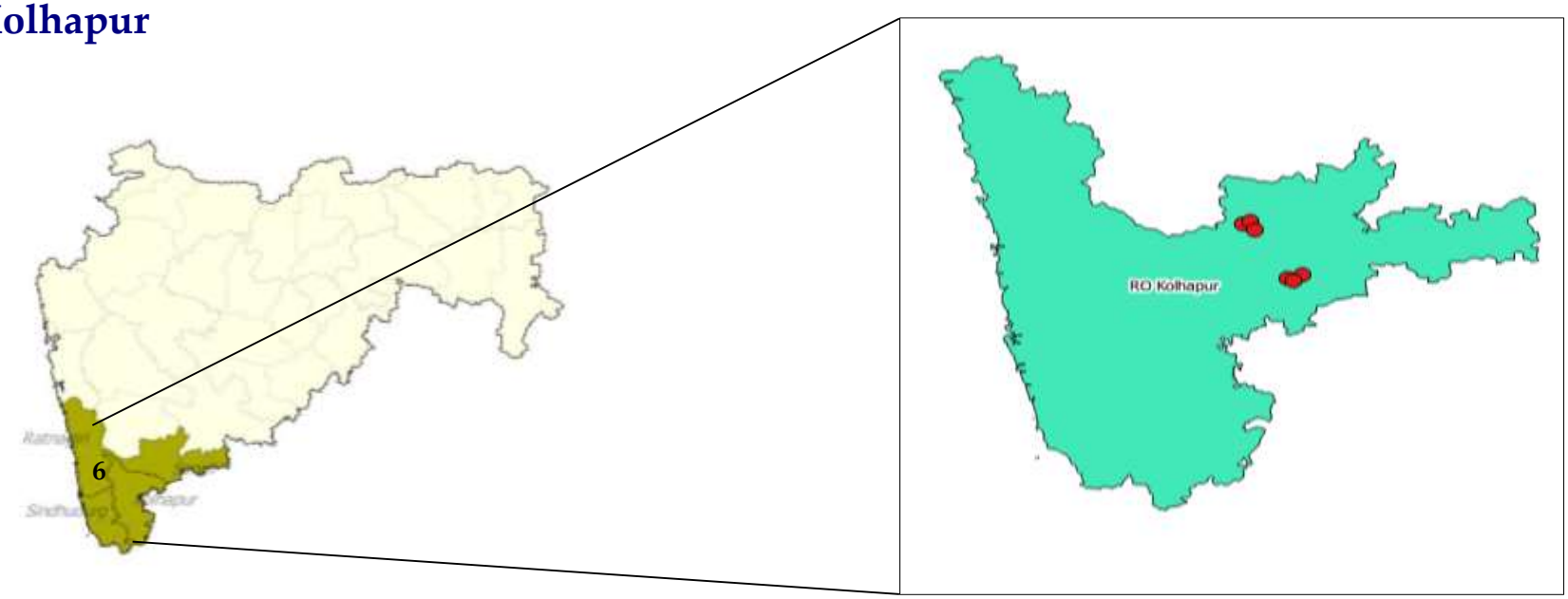
Figure No. 83: Annual average trend of SO_2, NOx, and RSPM at Powai Chowk - Ulhasnagar

Table No. 77: Percentage exceedance of pollutants at Kalyan RO

Station Name	Total Observations	Exceedence			% Exceedence		
		SO_2	NOx	RSPM	SO_2	NOx	RSPM
Ambernath	90	0	63	63	0	95	93
Badlapur - BIWA House	91	0	58	63	0	97	98
I.G.M. Hospital	98	0	95	98	0	97	100
Prematai hall	88	0	83	88	0	94	100
Dombivali	91	0	62	75	0	86	100
MIDC Office Dombivali	93	0	47	78	0	100	99
Dombivali	340	23	143	189	6.76	44	66
MPCB RO Kalyan office	108	0	62	98	0	57	91
Smt. CHM College Campus	95	0	73	80	0	81	85
Powai Chowk	91	0	57	61	0	80	97



Ro - Kolhapur



MPCB RO	Region	Station code	Station name	Type	Latitude (deg)	Longitude (deg)
Kolhapur	Kolhapur	508	Shivaji University Campus	Residential	17° 07' 40.1" N	74° 25' 16.9" E
	Kolhapur	509	Ruikar Trust	Rural and other areas	17° 10' 25.4" N	74° 24' 10.1" E
	Kolhapur	510	Mahadwar Road	Residential	17° 09' 27.0" N	74° 22' 10.6" E
	Sangli	574	Terrace of SRO-Sangli, Udyog Bhavan	Residential	16° 51' 11.8" N	74° 35' 28.9" E
	Sangli	575	Sangli-Miraj Primary Municipal school	Rural and other areas	16° 51' 39.4" N	74° 33' 52.5" E
	Sangli	576	Krishna Valley school	Industrial	16° 52' 49.4" N	74° 38' 02.3" E

Kolhapur - Shivaji University Campus

Table No. 78: Data for Monthly average reading recorded at Shivaji University Campus

Station Name	Year	Month	Average of SO_2(µg/m³)	Average of NOx(µg/m³)	Average of RSPM(µg/m³)
Shivaji University Campus	2018	Apr	14	26	74
		May	11	20	64
		Jun	10	14	53
		Jul	10	15	47
		Aug	10	16	47
		Sep	10	17	70
		Oct	10	17	52
		Nov	10	14	49
		Dec	12	21	66
	2019	Jan	16	29	71
		Feb	17	26	70

Note: Monthly graphs do not have any CPCB Standard[51]

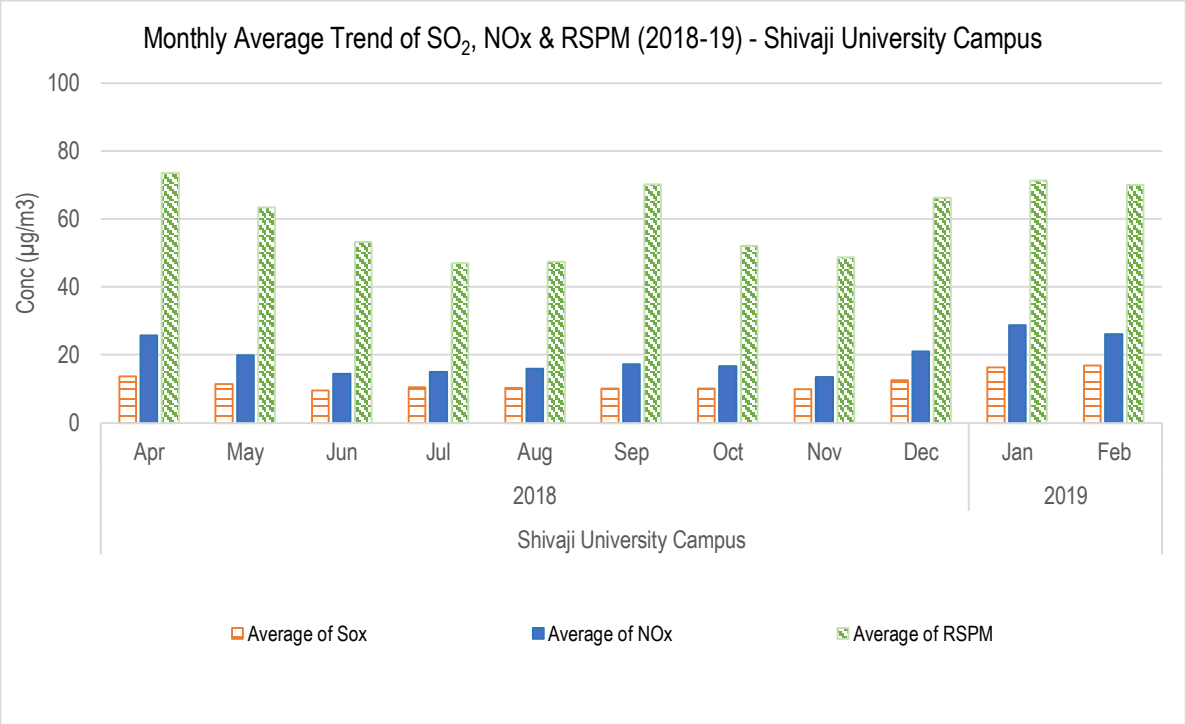


Figure No. 84: Monthly average reading recorded at Shivaji University Campus
Note: Data for the month of March is not available

[51] https://cpcb.nic.in/air-quality-standard/

Table No. 79: Data for Annual average trend of SO_2, NOx, and RSPM at Shivaji University Campus

Station Name	Year	Average of SO_2(µg/m³)	Average of NO_X(µg/m³)	Average of RSPM(µg/m³)
Annual Permissible Limit (CPCB)		*50*	*40*	*60*
Shivaji University Campus	05-06	4	7	40
	06-07	5	7	44
	07-08	5	3	46
	08-09	8	10	62
	09-10	8	4	55
	10-11	9	9	56
	11-12	10	13	60
	12-13	12	18	61
	13-14	14	20	64
	14-15	12	22	60
	15-16	13	23	63
	16-17	11	21	61
	17-18	13	22	60
	18-19	12	20	60

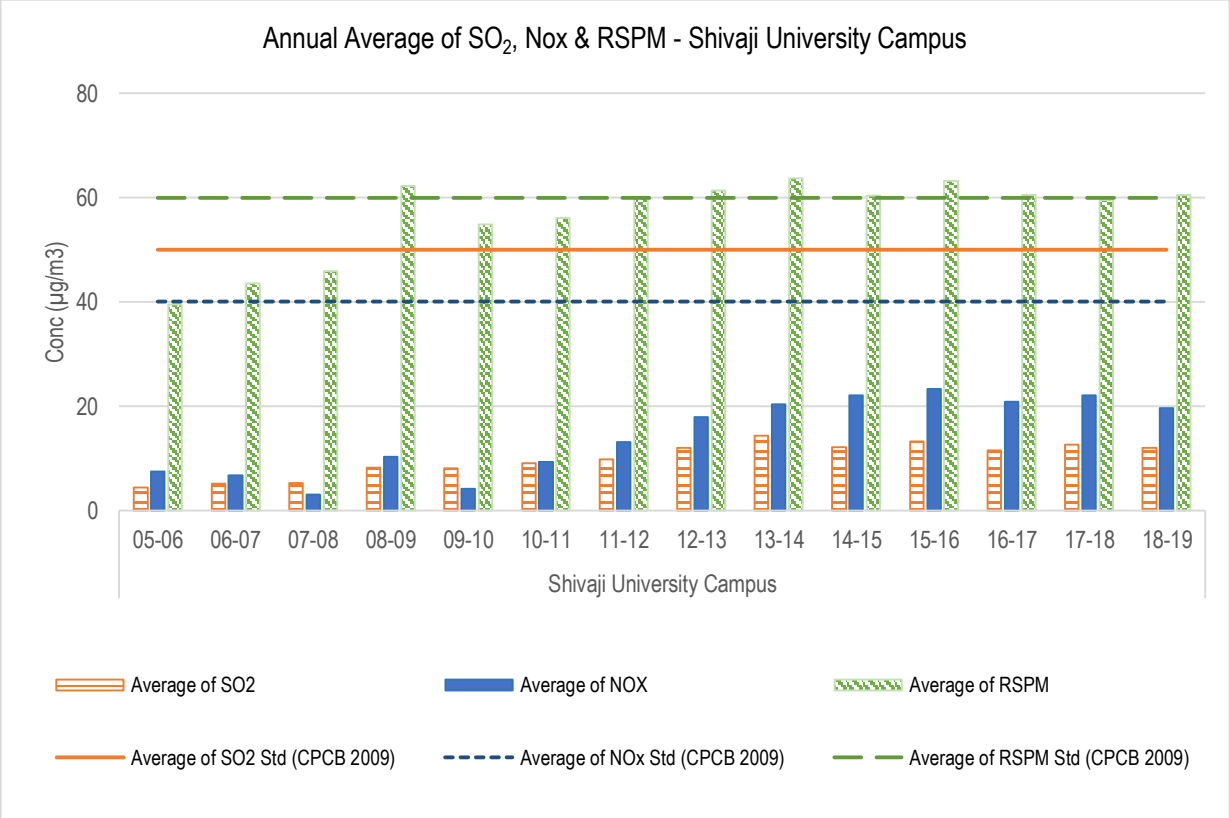


Figure No. 85: Annual average trend of SO_2, NOx, and RSPM at Shivaji University Campus

Kolhapur - Ruikar Trust

Table No. 80: Data for Monthly average reading recorded at Ruikar Trust - Kolhapur

Station Name	Year	Month	Average of SO_2(µg/m³)	Average of NOx(µg/m³)	Average of RSPM(µg/m³)
Ruikar Trust	2018	Apr	26	50	121
		May	27	50	112
		Jun	21	31	86
		Jul	21	28	98
		Aug	22	32	101
		Sep	25	44	106
		Oct	25	48	108
		Nov	27	45	112
		Dec	33	64	135
	2019	Jan	35	72	142
		Feb	34	59	135

Note: Monthly graphs do not have any CPCB Standard[52]

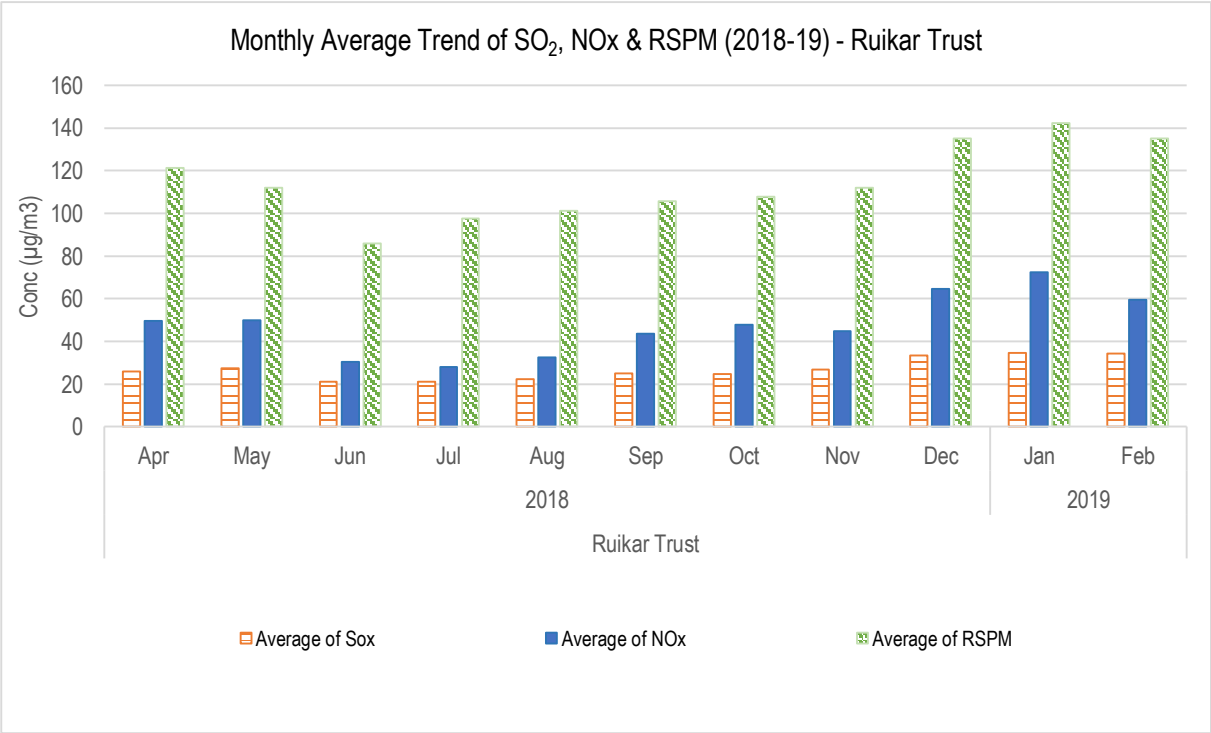


Figure No. 86: Monthly average reading recorded at Ruikar Trust – Kolhapur
Note: Data for the month of March is not available

[52] https://cpcb.nic.in/air-quality-standard/

Table No. 81: Data for Annual average trend of SO_2, NOx, and RSPM at Ruikar Trust - Kolhapur

Station Name	Year	Average of SO_2(µg/m³)	Average of NO_X(µg/m³)	Average of RSPM(µg/m³)
Auual Permissible Limit (CPCB)		*50*	*40*	*60*
Ruikar Trust	05-06	12	45	108
	06-07	11	39	96
	07-08	10	27	95
	08-09	16	27	100
	09-10	16	20	99
	10-11	21	27	105
	11-12	24	33	116
	12-13	27	42	159
	13-14	27	48	141
	14-15	28	50	118
	15-16	25	52	120
	16-17	29	53	120
	17-18	28	48	117
	18-19	26	46	114

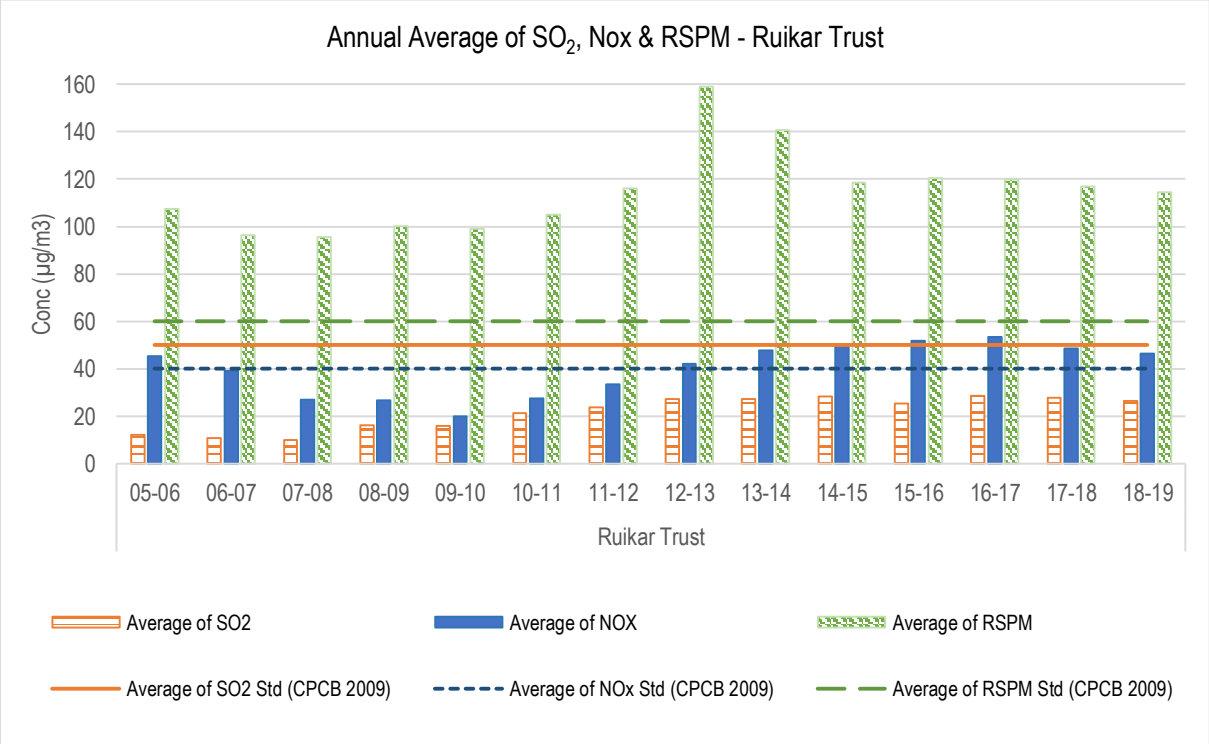


Figure No. 87: Annual average trend of SO_2, NOx, and RSPM at Ruikar Trust - Kolhapur

Kolhapur - Mahadwar Road

Table No. 82: Data for Monthly average reading recorded at Mahadwar Road

Station Name	Year	Month	Average of SO_2(µg/m³)	Average of NOx(µg/m³)	Average of RSPM(µg/m³)
Mahadwar Road	2018	Apr	22	42	103
		May	22	37	88
		Jun	16	23	70
		Jul	14	22	74
		Aug	17	24	86
		Sep	20	32	86
		Oct	20	32	86
		Nov	23	35	92
		Dec	28	54	114
	2019	Jan	30	59	122
		Feb	27	50	119

Note: Monthly graphs do not have any CPCB Standard[53]

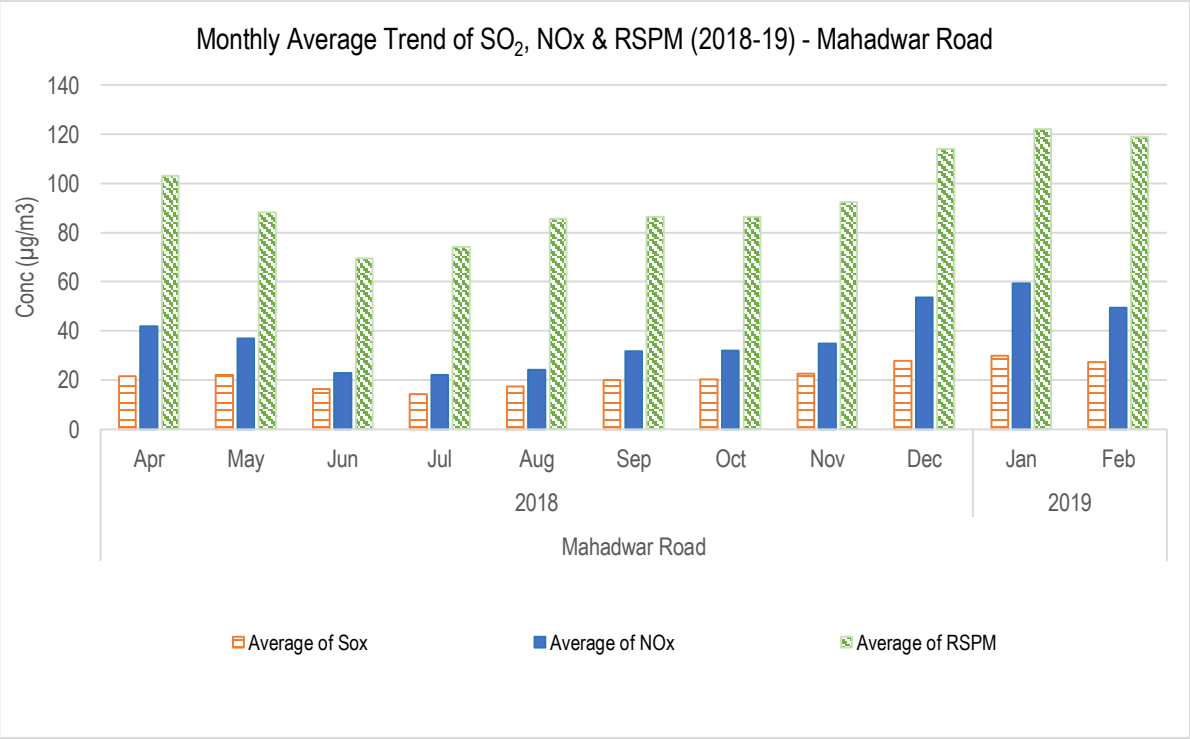


Figure No. 88: Monthly average reading recorded at Mahadwar Road
Note: Data for the month of March is not available

[53] https://cpcb.nic.in/air-quality-standard/

Table No. 83: Data for Annual average trend of SO_2, NOx, and RSPM at Mahadwar Road

Station Name	Year	Average of SO_2(µg/m³)	Average of NO_X(µg/m³)	Average of RSPM(µg/m³)
Annual Permissible Limit (CPCB)		*50*	*40*	*60*
Mahadwar Road	05-06	8	28	69
	06-07	8	21	64
	07-08	8	11	75
	08-09	12	17	84
	09-10	13	15	86
	10-11	17	21	92
	11-12	20	26	102
	12-13	25	35	136
	13-14	23	37	113
	14-15	24	38	104
	15-16	21	40	106
	16-17	23	39	99
	17-18	21	36	90
	18-19	22	37	95

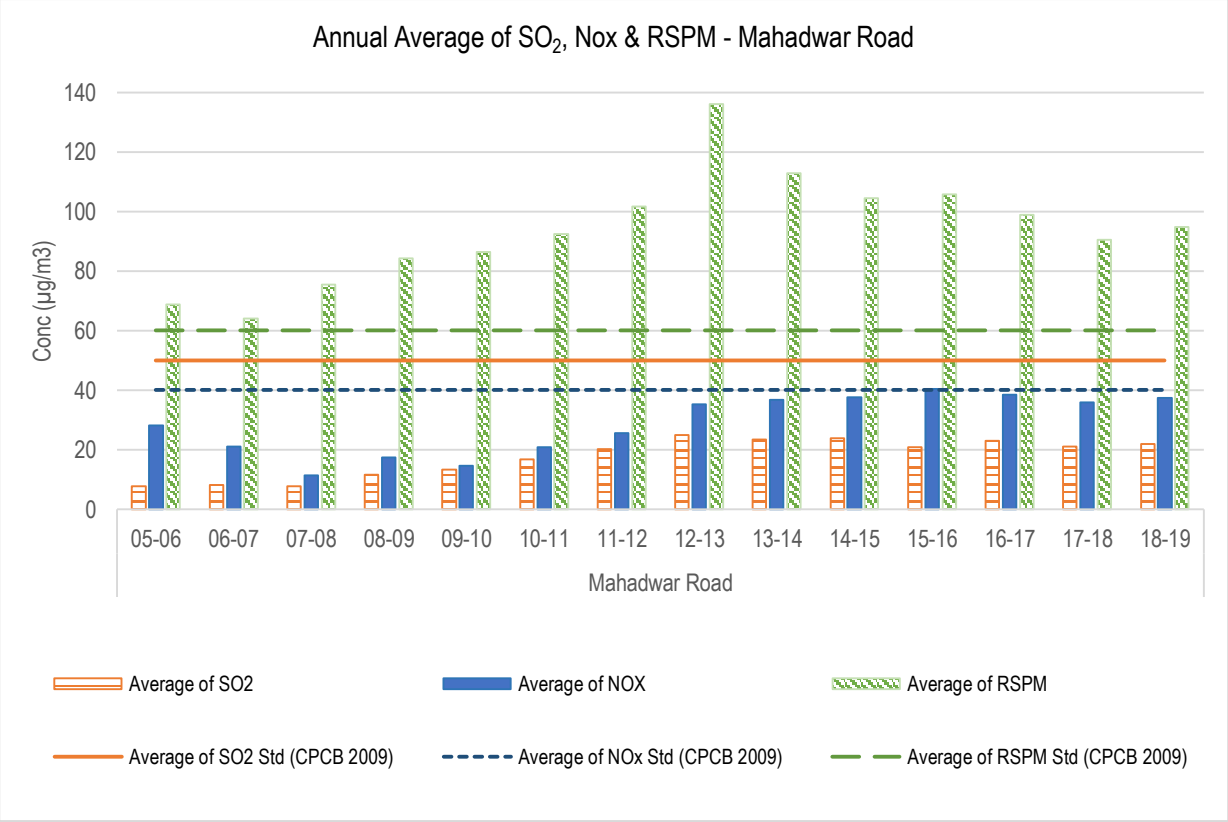


Figure No. 89: Annual average trend of SO_2, NOx, and RSPM at Mahadwar Road

Sangli - Terrace of SRO – Sangli, Udyog Bhavan

Table No. 84: Data for Monthly average reading recorded at Terrace of SRO – Sangli, Udyog Bhavan

Station Name	Year	Month	Average of SO_2(µg/m³)	Average of NOx(µg/m³)	Average of RSPM(µg/m³)
Terrace of SRO-Sangli, Udyog Bhavan	2018	Apr	10	32	73
		May	8	30	65
		Jun	7	25	63
		Jul	6	22	34
		Aug	7	25	31
		Sep	7	31	51
		Oct	7	38	77
		Nov	8	44	94
		Dec	9	57	106
	2019	Jan	9	56	119
		Feb	10	44	119
		Mar	9	46	96

Note: Monthly graphs do not have any CPCB Standard[54]

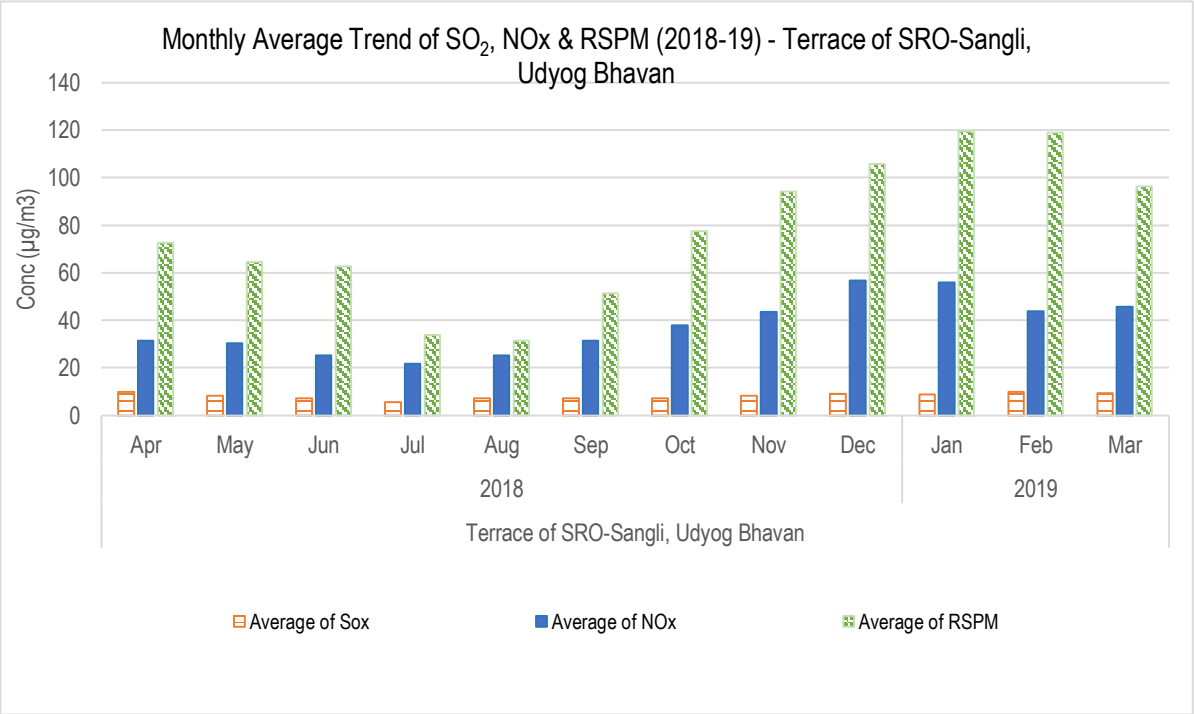


Figure No. 90: Monthly average reading recorded at Terrace of SRO – Sangli, Udyog Bhavan

[54] https://cpcb.nic.in/air-quality-standard/

Table No. 85: Data for Annual average trend of SO_2, NOx, and RSPM at Terrace of SRO – Sangli, Udyog Bhavan

Station Name	Year	Average of SO2(µg/m³)	Average of NOX(µg/m³)	Average of RSPM(µg/m³)
Annual Permissible Limit (CPCB)		*50*	*40*	*60*
Terrace of SRO-Sangli, Udyog Bhavan	08-09	25	19	57
	09-10	22	27	54
	10-11	12	29	54
	11-12	10	36	63
	12-13	10	39	70
	13-14	9	34	69
	14-15	12	42	67
	15-16	10	38	82
	16-17	8	41	78
	17-18	9	35	83
	18-19	8	36	76

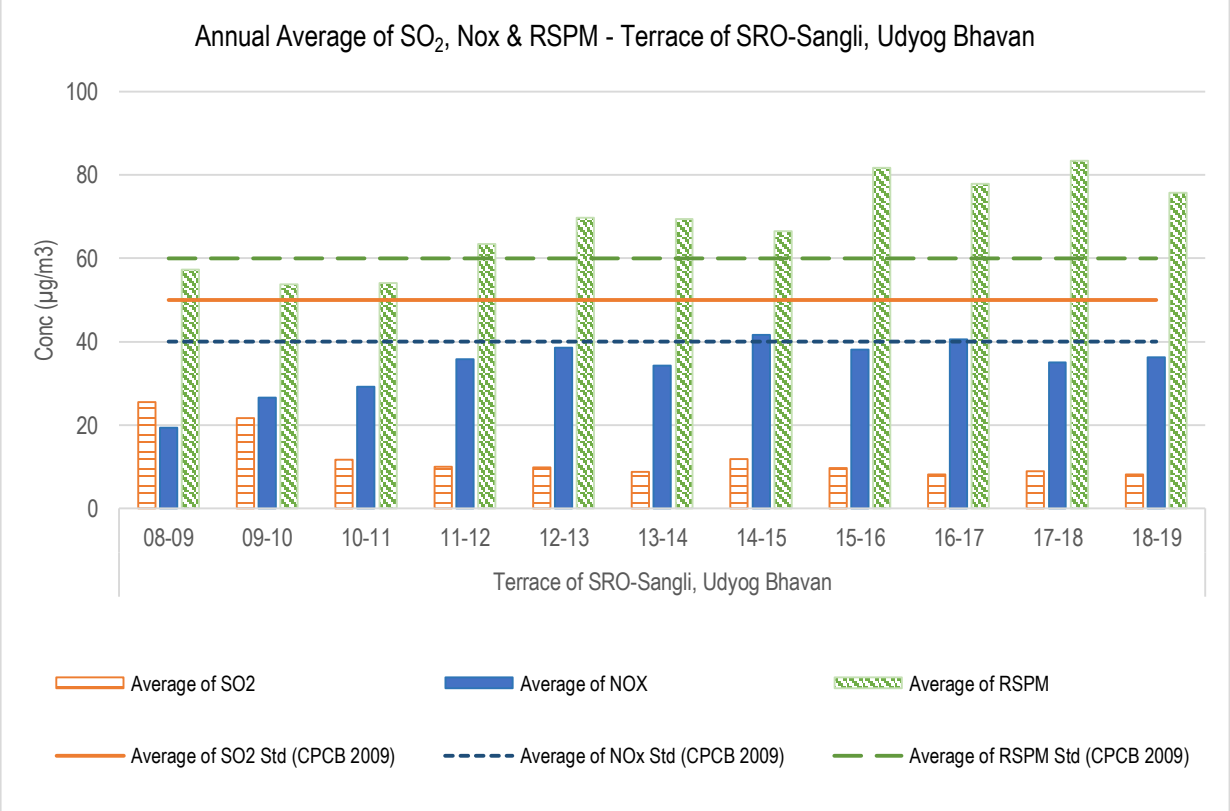


Figure No. 91: Annual average trend of SO_2, NOx, and RSPM at Terrace of SRO – Sangli, Udyog Bhavan

Sangli - Sangli - Miraj Primary Municipal School

Table No. 86: Data for Monthly average reading recorded at Sangli - Miraj Primary Municipal School

Station Name	Year	Month	Average of SO_2(µg/m³)	Average of NOx(µg/m³)	Average of RSPM(µg/m³)
Sangli-Miraj Primary Municipal school	2018	Apr	12	45	64
		May	10	42	52
		Jun	9	33	68
		Jul	8	29	39
		Aug	10	27	31
		Sep	8	37	45
		Oct	10	60	63
		Nov	11	65	97
		Dec	12	65	132
	2019	Jan	12	63	155
		Feb	12	69	129
		Mar	11	60	98

Note: Monthly graphs do not have any CPCB Standard[55]

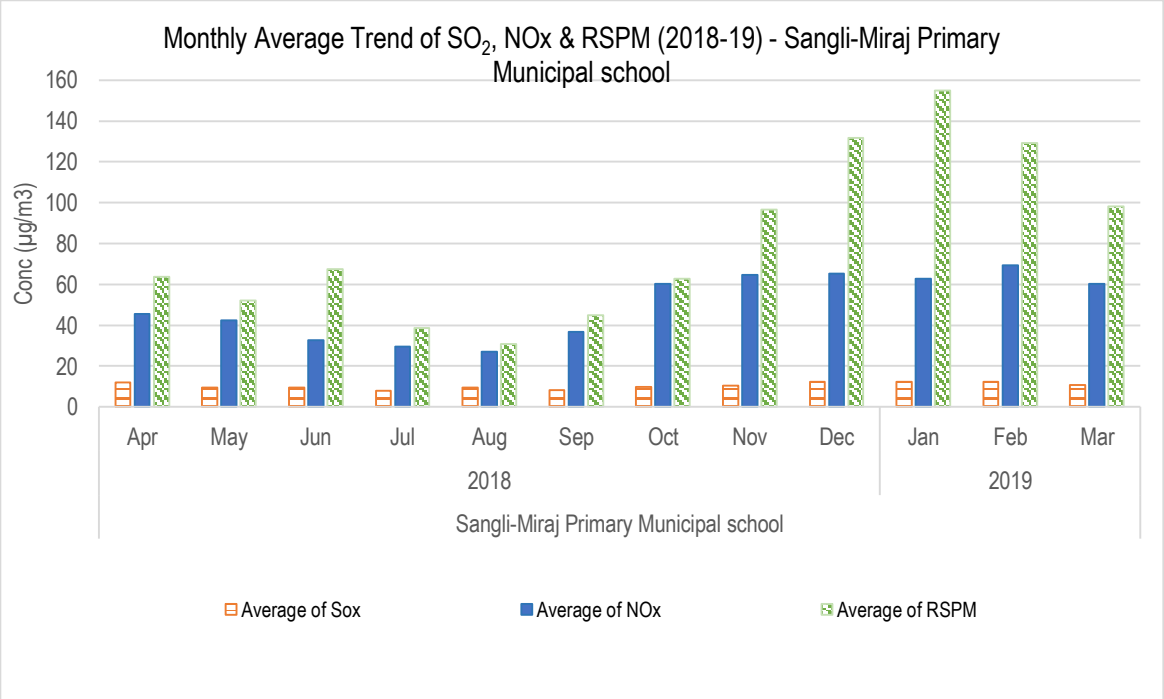


Figure No. 92: Monthly average reading recorded at Sangli - Miraj Primary Municipal School

[55] https://cpcb.nic.in/air-quality-standard/

Table No. 87: Data for Annual average trend of SO_2, NOx, and RSPM at Sangli - Miraj Primary Municipal School

Station Name	Year	Average of SO_2(µg/m³)	Average of NO_X(µg/m³)	Average of RSPM(µg/m³)
Annual Permissible Limit (CPCB)		*50*	*40*	*60*
Sangli-Miraj Primary Municipal school	08-09	22	23	87
	09-10	23	32	68
	10-11	13	32	69
	11-12	10	36	72
	12-13	11	44	79
	13-14	9	40	74
	14-15	13	48	91
	15-16	11	44	77
	16-17	9	44	72
	17-18	12	50	81
	18-19	10	47	80

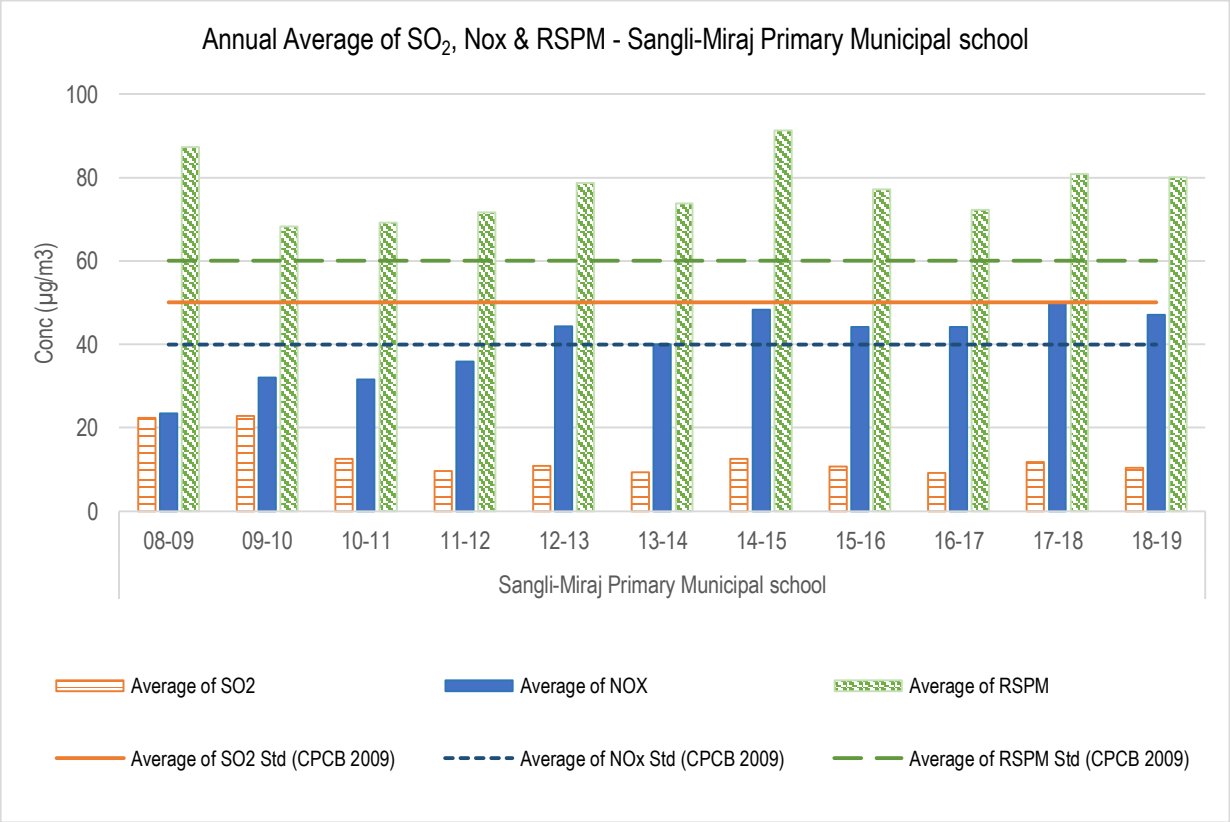


Figure No. 93: Annual average trend of SO_2, NOx, and RSPM at Sangli - Miraj Primary Municipal School

Sangli - Krishna Valley School

Table No. 88: Data for Monthly average reading recorded at Krishna Valley School

Station Name	Year	Month	Average of SO_2(µg/m³)	Average of NOx(µg/m³)	Average of RSPM(µg/m³)
Krishna Valley school	2018	Apr	11	42	85
		May	9	38	59
		Jun	8	28	64
		Jul	8	26	41
		Aug	9	25	37
		Sep	7	39	53
		Oct	10	44	84
		Nov	10	51	79
		Dec	11	52	123
	2019	Jan	12	64	124
		Feb	11	57	141
		Mar	11	58	130

Note: Monthly graphs do not have any CPCB Standard[56]

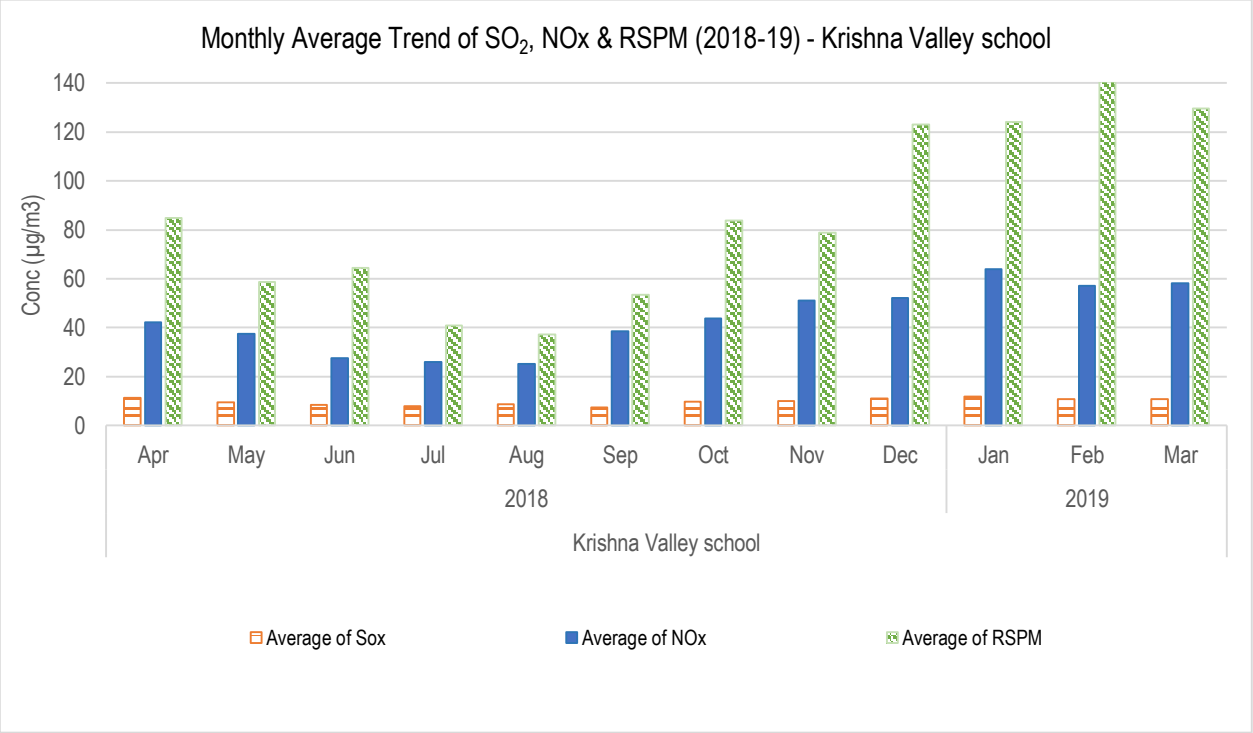


Figure No. 94: Monthly average reading recorded at Krishna Valley School

[56] https://cpcb.nic.in/air-quality-standard/

Table No. 89: Data for Annual average trend of SO_2, NOx, and RSPM at Krishna Valley School

Station Name	Year	Average of SO_2(µg/m³)	Average of NO_X(µg/m³)	Average of RSPM(µg/m³)
Annual Permissible Limit (CPCB)		*50*	*40*	*60*
Krishna Valley school	08-09	26	21	71
	09-10	24	34	82
	10-11	12	30	75
	11-12	10	36	89
	12-13	12	43	97
	13-14	11	37	95
	14-15	13	44	103
	15-16	11	37	92
	16-17	9	35	76
	17-18	11	40	80
	18-19	10	40	83

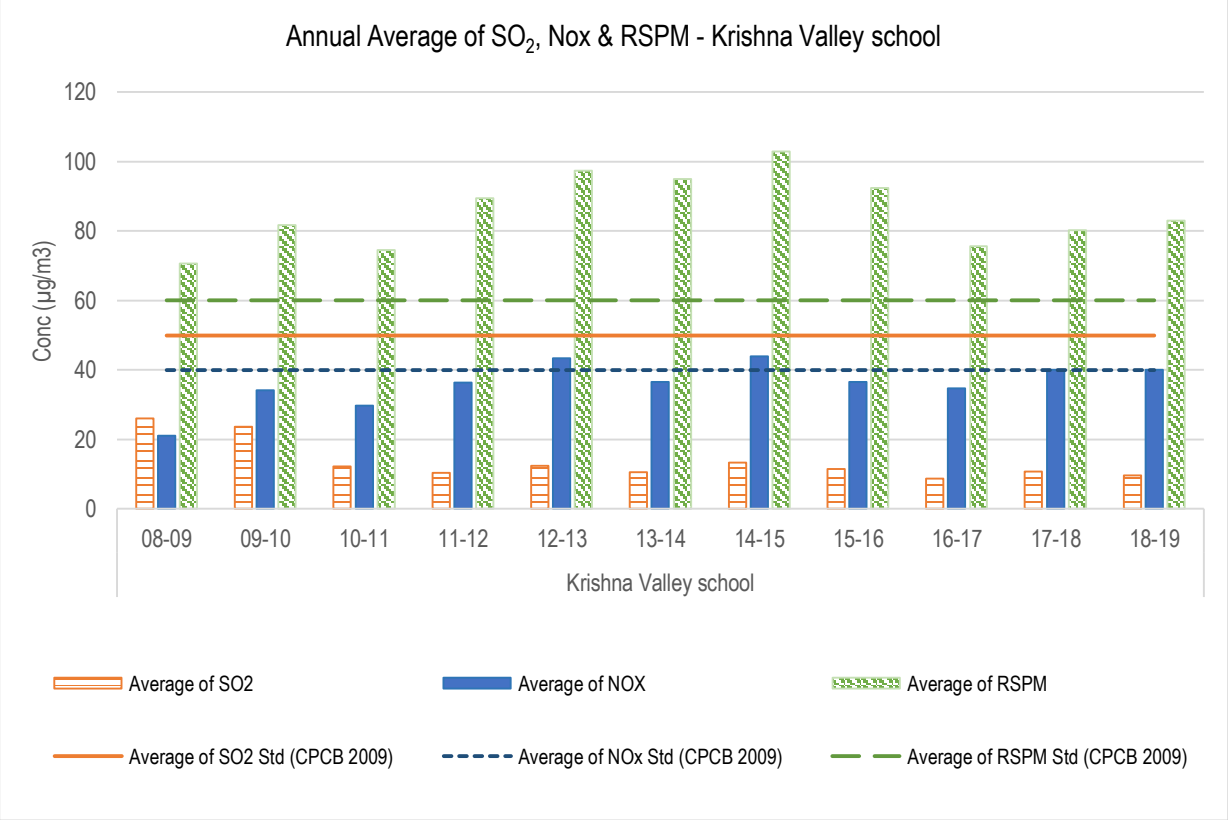
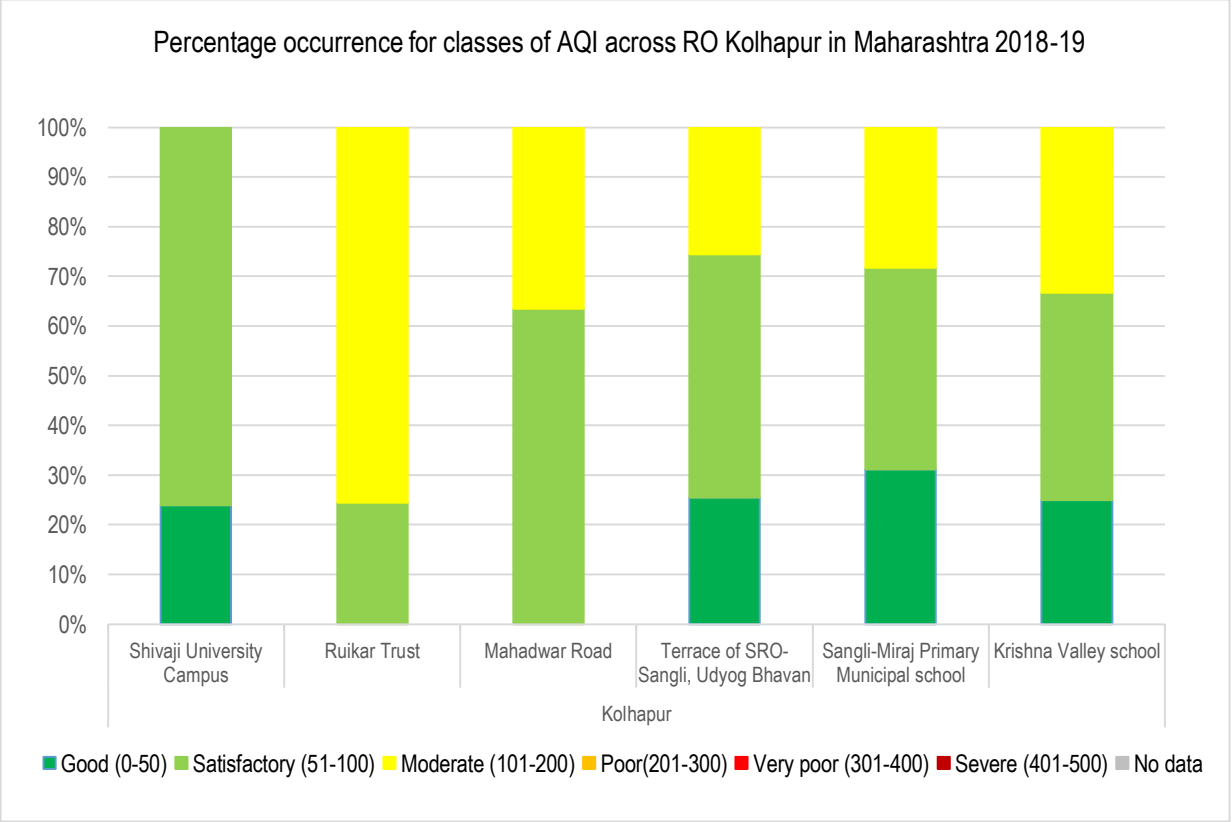


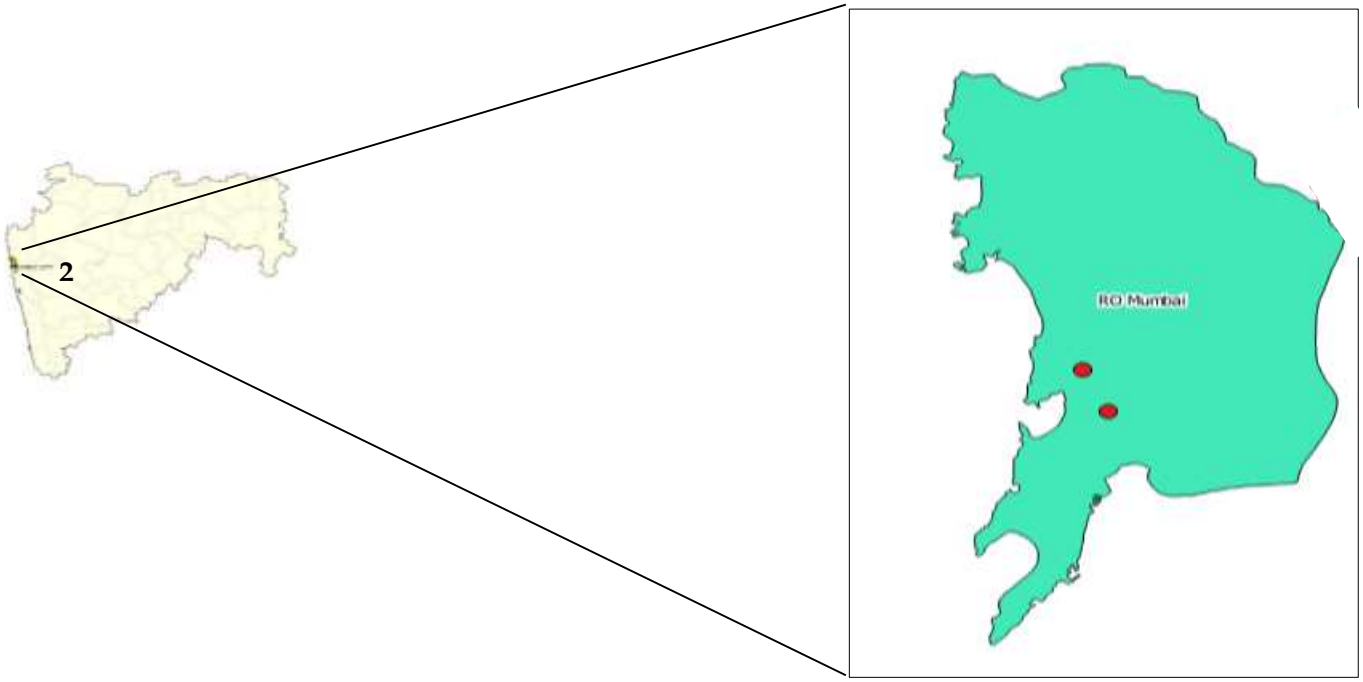
Figure No. 95: Annual average trend of SO_2, NOx, and RSPM at Krishna Valley School

Table No. 90: Percentage exceedance of pollutants at Kolhapur RO

Station Name	Total Observations	Exceedence			% Exceedence		
		SO_2	NOx	RSPM	SO_2	NOx	RSPM
Shivaji University Campus	92	0	0	46	0	0	50
Ruikar Trust	94	0	60	94	0	68	100
Mahadwar Road	93	0	34	93	0	37	100
Terrace of SRO-Sangli, Udyog Bhavan	98	0	34	64	0	36	65
Sangli-Miraj Primary Municipal school	108	0	51	64	0	57	60
Krishna Valley school	98	0	34	64	0	41	67



RO - Mumbai



MPCB RO	Region	Station code	Station name	Type	Latitude (deg)	Longitude (deg)
Mumbai	Mumbai		Bandra	Residential	19° 03' 47.1" N	72° 50' 47.2" E
	Mumbai	441	Sion	Residential	19° 02' 07.9" N	72° 51' 35.3" E

Mumbai - Bandra

Table No. 91: Data for Monthly average reading recorded at Bandra

Station Name	Year	Month	Average of SO_2(µg/m³)	Average of NOx(µg/m³)	Average of RSPM(µg/m³)
Bandra	2018	Apr	25	66	80
		May	22	46	72
		Jun	23	51	63
		Jul	14	35	59
		Aug	13	38	60
		Sep	14	53	70
		Oct	19	64	128
		Nov	22	103	158
		Dec	21	102	166
	2019	Jan	24	107	191
		Feb	19	82	160
		Mar	9	65	122

Note: Monthly graphs do not have any CPCB Standard[57]

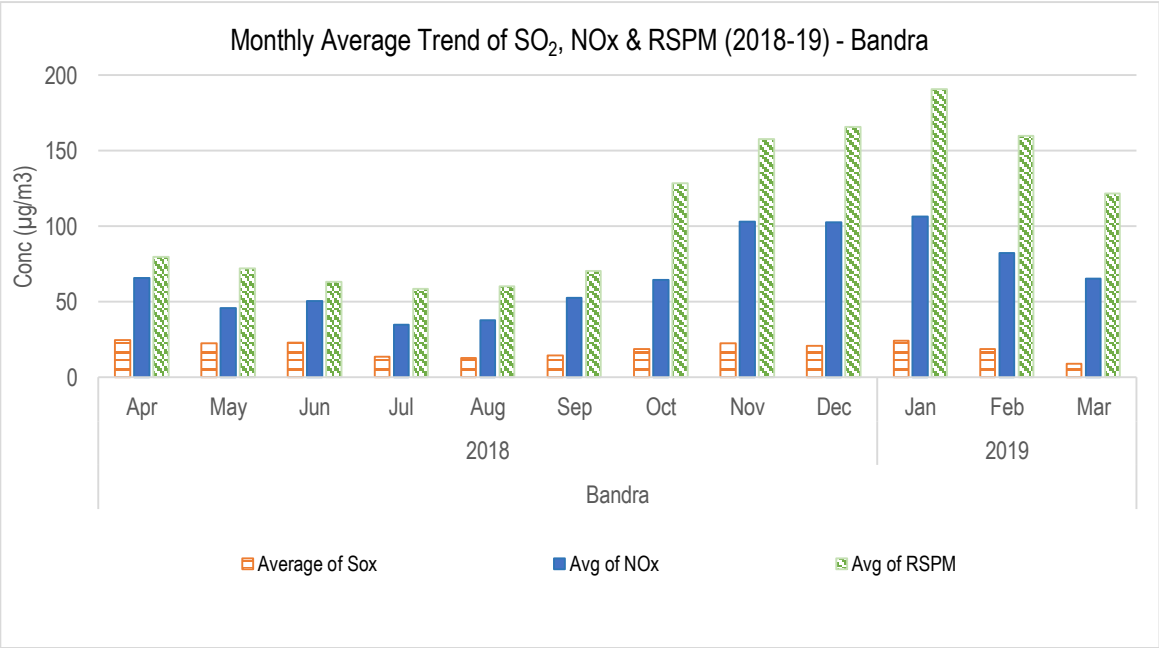


Figure No. 96: Monthly average reading recorded at Bandra

[57] https://cpcb.nic.in/air-quality-standard/

Table No. 92: Data for Annual average trend of SO_2, NOx, and RSPM at Bandra

Station Name	Year	Average of SO_2(µg/m³)	Average of NO_X(µg/m³)	Average of RSPM(µg/m³)
Annual Permissible Limit (CPCB)		*50*	*40*	*60*
Bandra	07-08	19	59	158
	08-09	19	60	137
	09-10	17	90	140
	10-11	19	48	116
	11-12	21	65	131
	12-13	18	48	116
	13-14	20	49	106
	14-15	16	52	114
	15-16	18	49	93
	16-17	13	40	122
	17-18	14	49	106
	18-19	19	66	111

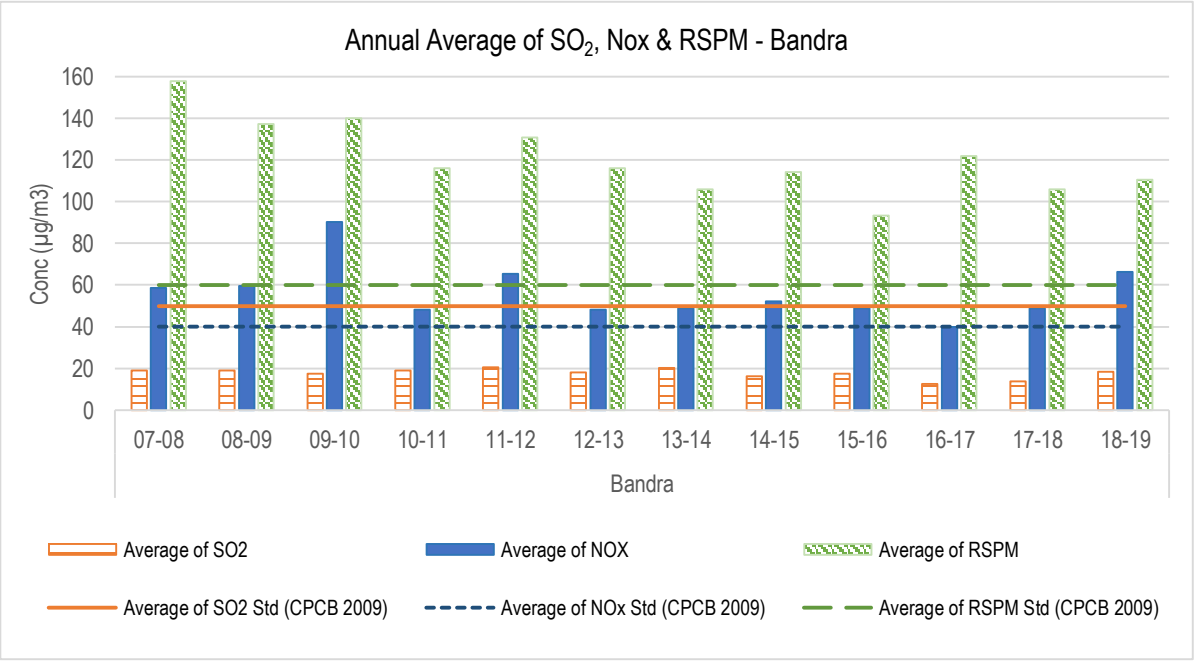


Figure No. 97: Annual average trend of SO_2, NOx, and RSPM at Bandra

Mumbai - Sion

Table No. 93: Data for Monthly average reading recorded at Sion

Station Name	Year	Month	Average of SO_2(µg/m³)	Average of NOx(µg/m³)	Average of RSPM(µg/m³)
Sion	2018	Apr	6	59	173
		May	8	53	127
		Jun	5	52	81
		Jul	4	51	72
		Aug	4	40	65
		Sep	4	62	78
		Oct	5	108	121
		Nov	4	113	145
		Dec	5	113	146
	2019	Jan	4	121	253
		Feb	4	126	307
		Mar	5	90	180

Note: Monthly graphs do not have any CPCB Standard[58]

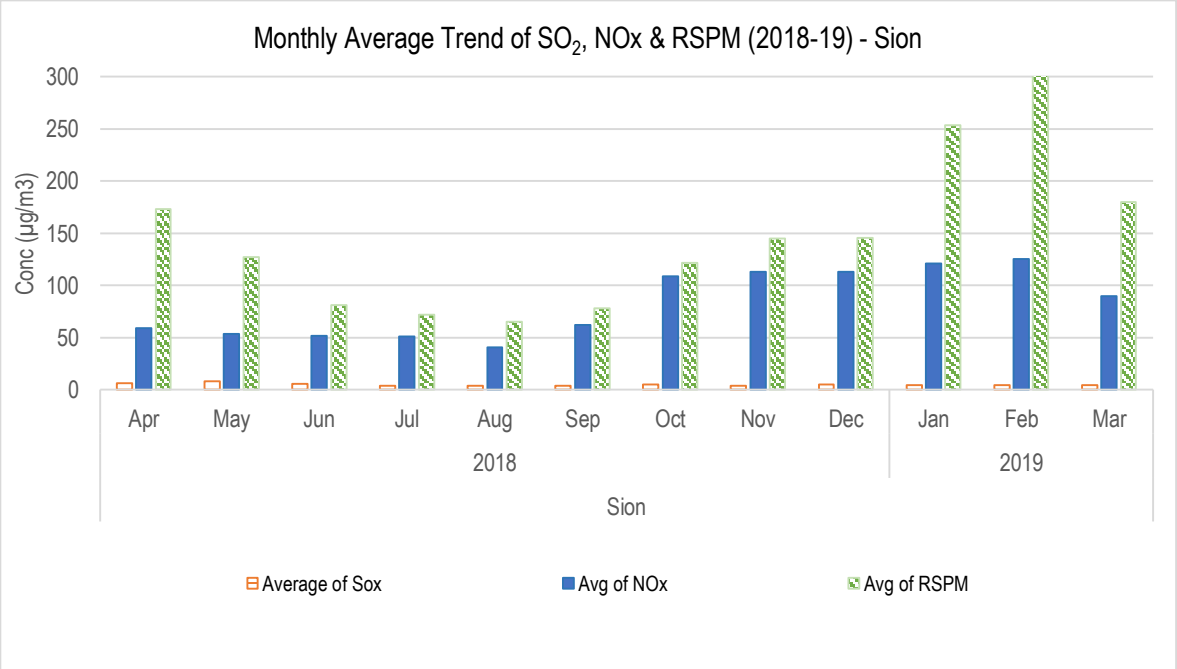


Figure No. 98: Monthly average reading recorded at Sion

[58] https://cpcb.nic.in/air-quality-standard/

Table No. 94: Data for Annual average trend of SO_2, NOx, and RSPM at Sion

Station Name	Year	Average of SO_2(µg/m³)	Average of NO_X(µg/m³)	Average of RSPM(µg/m³)
Annual Permissible Limit (CPCB)		*50*	*40*	*60*
Sion	04-05	21	67	197
	05-06	26	105	231
	06-07	30	91	255
	07-08	28	139	295
	08-09	24	97	202
	09-10	18	109	223
	10-11	14	116	181
	11-12	10	66	150
	12-13	11	106	136
	13-14	8	108	131
	14-15	8	91	117
	15-16	14	81	148
	16-17	8	83	149
	17-18	6	77	148
	18-19	5	83	147

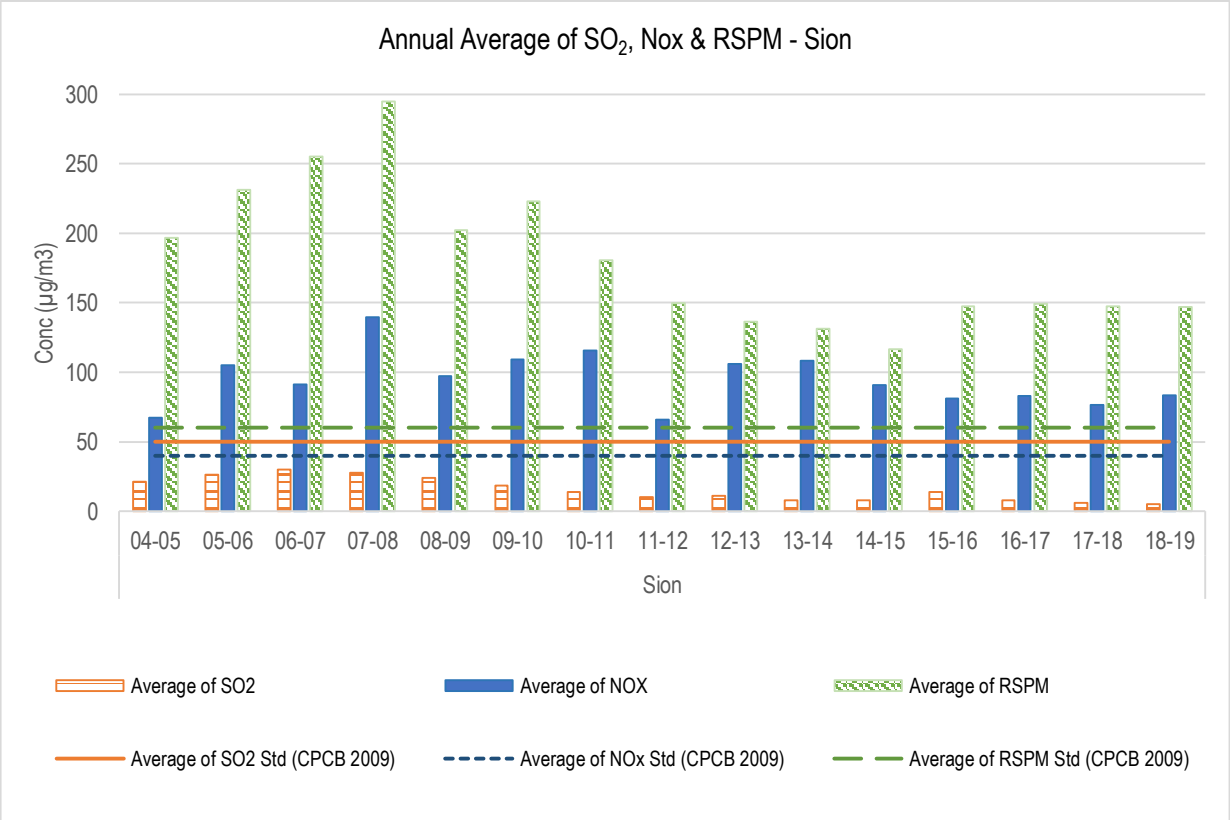
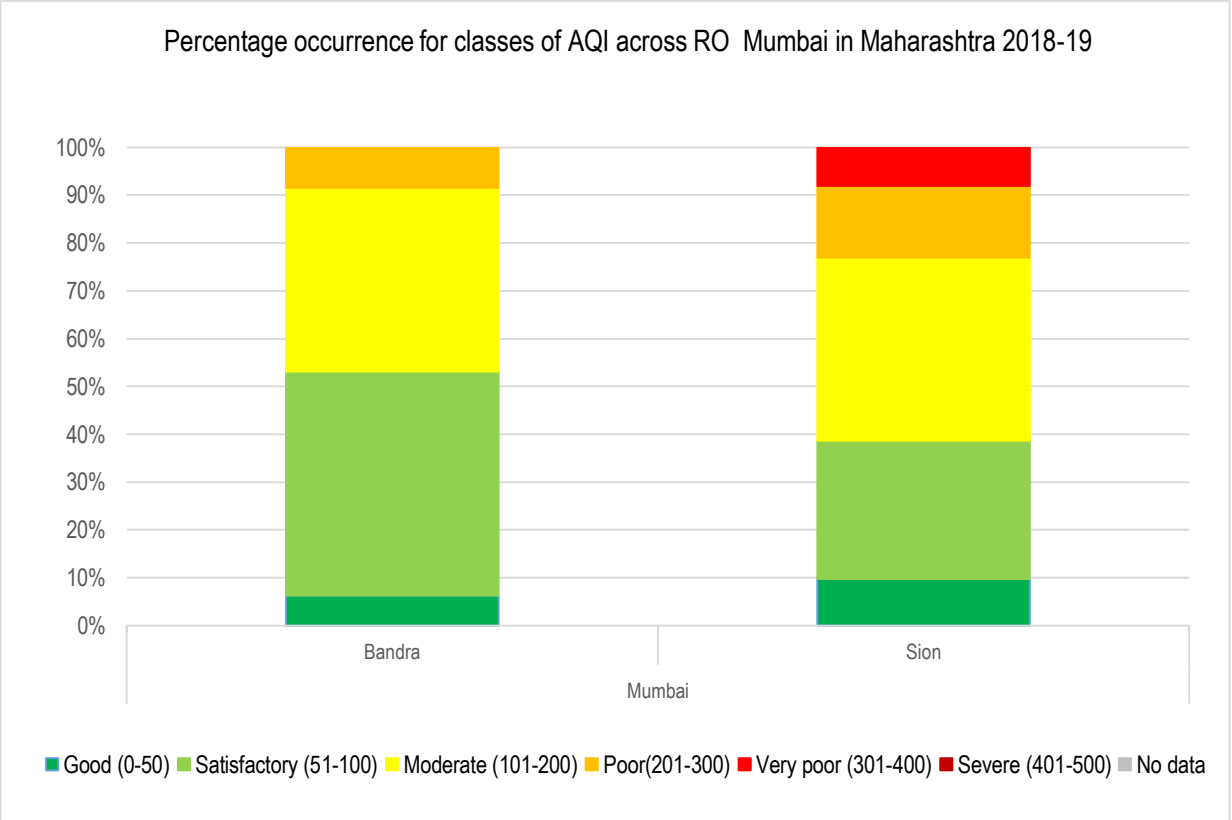


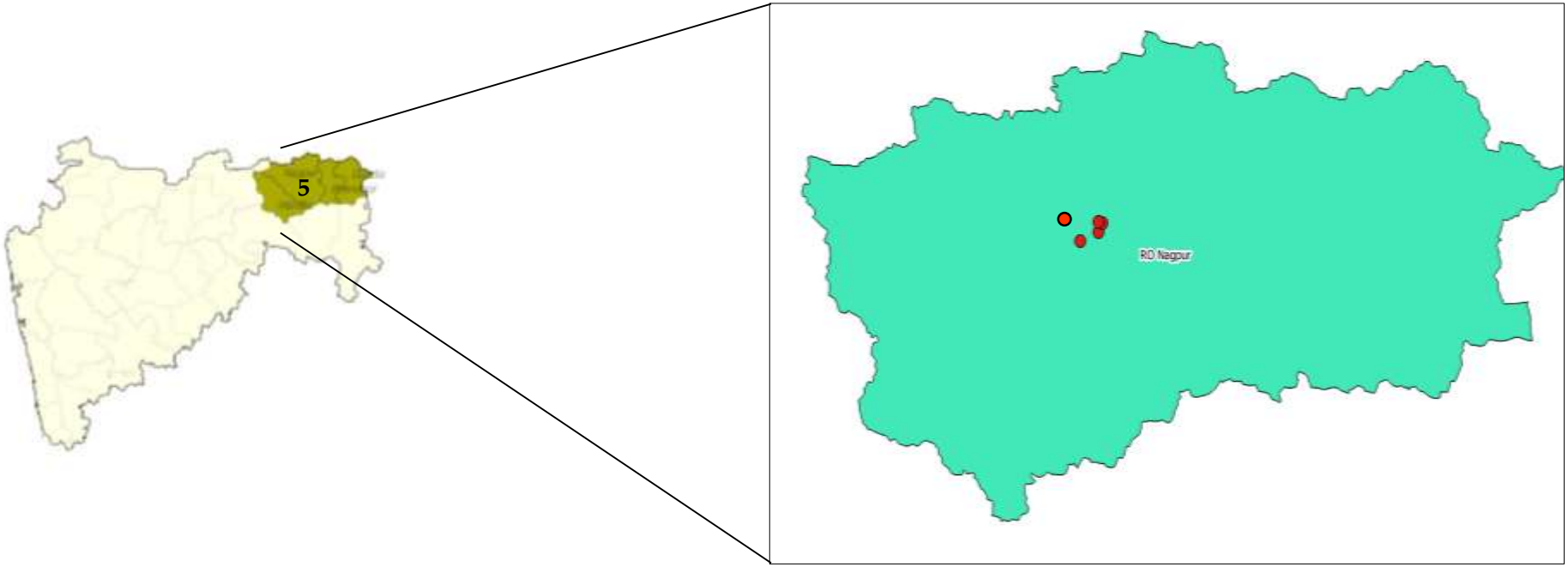
Figure No. 99: Annual average trend of SO_2, NOx, and RSPM at Sion

Table No. 95: Percentage exceedance of pollutants at Mumbai RO

Station Name	Total Observations	Exceedence			% Exceedence		
		SO_2	NOx	RSPM	SO_2	NOx	RSPM
Bandra	364	0	261	289	0	73	79
Sion	225	1	190	199	0	85	88



RO – Nagpur



MPCB RO	Region	Station code	Station name	Type	Latitude (deg)	Longitude (deg)
Nagpur	Nagpur	287	IOE North Ambazari road	Residential	21° 08' 10.0" N	79° 04' 08.5" E
	Nagpur	288	MIDC Office, Hingna Road	Industrial	21° 06' 35.5" N	79° 00' 27.2" E
	Nagpur	314	Govt Polytechnic Col, Sadar	Rural and other areas	21° 09' 47.6" N	79° 04' 57.6" E
	Nagpur	711	Civil lines Nagpur	Residential	21° 09' 28.6" N	79° 04' 12.1" E
	Nagpur		Nagpur CAAQMS	Commercial	21° 09'03.61"N	79° 04' 06.00"E

Nagpur - IOE North Ambazari road

Table No. 96: Data for Monthly average reading recorded at IOE North Ambazari road

Station Name	Year	Month	Average of SO_2(µg/m³)	Average of NOx(µg/m³)	Average of RSPM(µg/m³)
IOE North Ambazari road	2018	Apr	11	37	99
		May	11	34	122
		Jun	10	31	117
		Jul	11	34	127
		Aug	12	38	121
		Sep	12	38	105
		Oct	11	37	130
		Nov	19	46	114
		Dec	13	39	102
	2019	Jan	14	43	105
		Feb	12	36	112
		Mar	14	40	84

Note: Monthly graphs do not have any CPCB Standard[59]

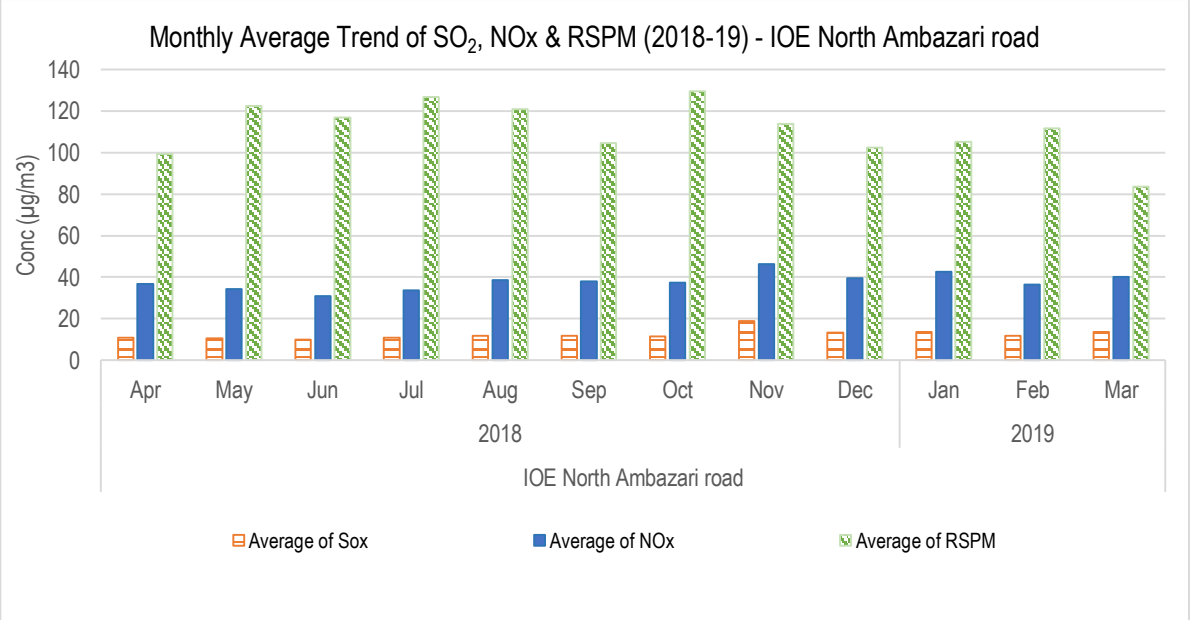


Figure No. 100: Monthly average reading recorded at IOE North Ambazari road

[59] https://cpcb.nic.in/air-quality-standard/

Table No. 97: Data for Annual average trend of SO_2, NOx, and RSPM at IOE North Ambazari road

Station Name	Year	Average of SO_2(µg/m³)	Average of NO_X(µg/m³)	Average of RSPM(µg/m³)
Annual Permisssible Limit (CPCB)		*50*	*40*	*60*
IOE North Ambazari road	04-05	8	21	52
	05-06	9	30	44
	06-07	10	27	66
	07-08	8	22	125
	08-09	8	30	114
	09-10	10	36	109
	10-11	10	33	96
	11-12	10	34	84
	12-13	11	39	96
	13-14	10	29	90
	14-15	10	32	106
	15-16	10	31	101
	16-17	10	31	92
	17-18	11	33	95
	18-19	13	39	111

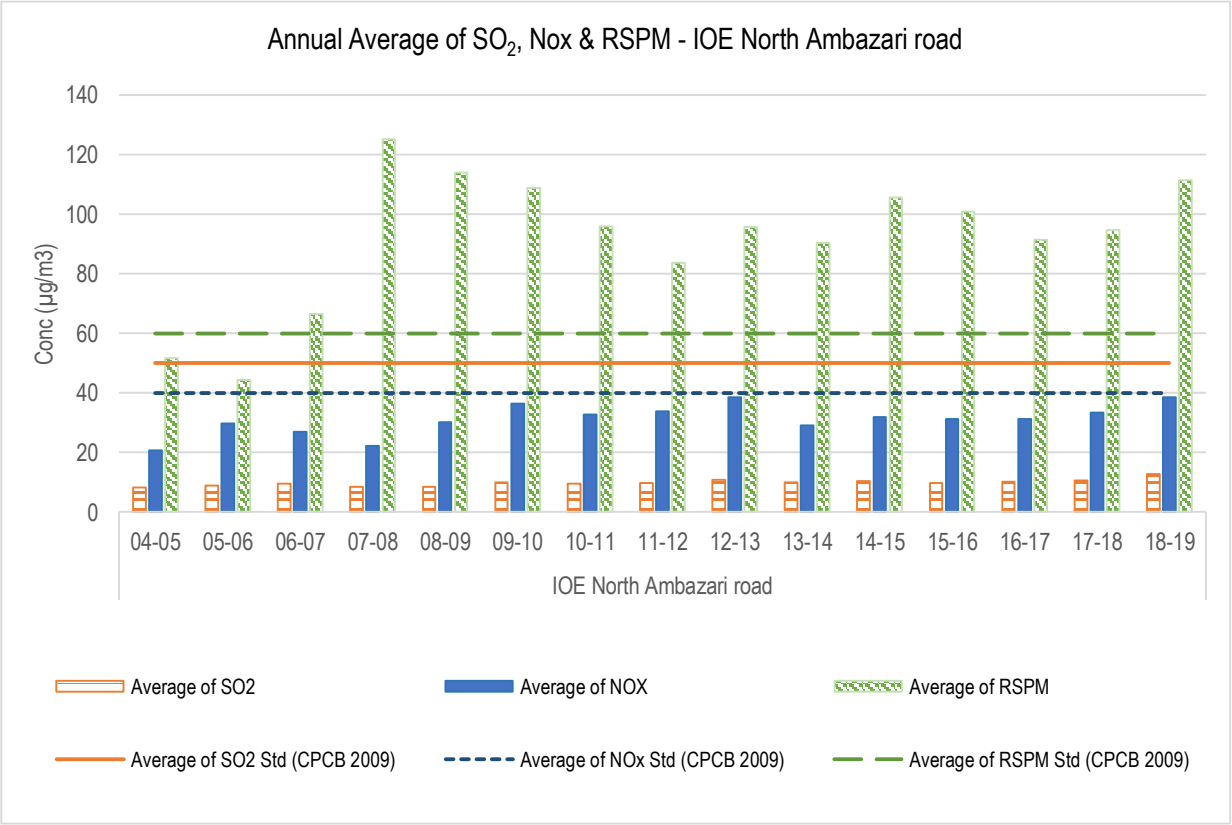


Figure No. 101: Annual average trend of SO_2, NOx, and RSPM at IOE North Ambazari road

Nagpur - MIDC Office, Hingna Road

Table No. 98: Data for Monthly average reading recorded at MIDC Office, Hingna Road

Station Name	Year	Month	Average of SO_2(µg/m³)	Average of NOx(µg/m³)	Average of RSPM(µg/m³)
MIDC Office, Hingna Road	2018	Apr	11	38	110
		May	10	34	125
		Jun	9	29	117
		Jul	11	36	130
		Aug	11	37	124
		Sep	12	38	118
		Oct	12	37	137
		Nov	20	48	134
		Dec	14	41	112
	2019	Jan	16	45	101
		Feb	13	42	110
		Mar	18	48	101

Note: Monthly graphs do not have any CPCB Standard[60]

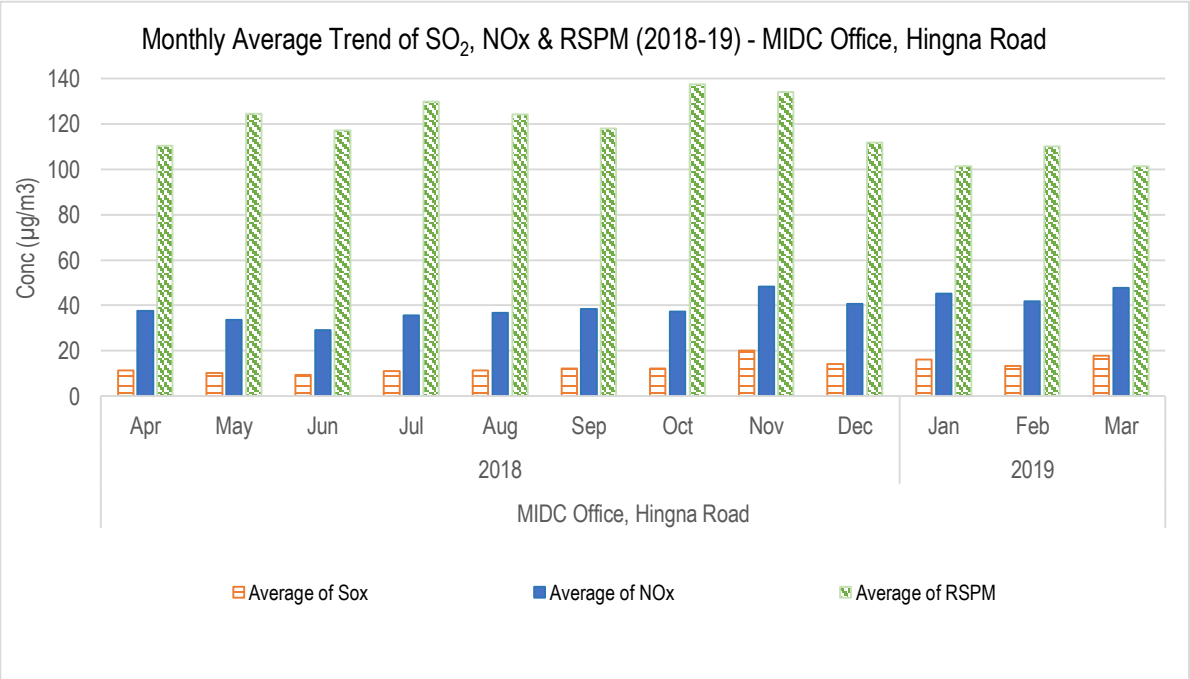


Figure No. 102: Monthly average reading recorded at MIDC Office, Hingna Road

[60] https://cpcb.nic.in/air-quality-standard/

Table No. 99: Data for Annual average trend of SO_2, NOx, and RSPM at MIDC Office, Hingna Road

Station Name	Year	Average of SO_2(µg/m³)	Average of NO_X(µg/m³)	Average of RSPM(µg/m³)
Annual Permissbile Limit (CPCB)		*50*	*40*	*60*
MIDC Office, Hingna Road	04-05	9	22	51
	05-06	10	34	40
	06-07	9	25	90
	07-08	9	24	160
	08-09	9	30	118
	09-10	10	38	128
	10-11	10	34	113
	11-12	10	35	105
	12-13	11	41	125
	13-14	10	31	119
	14-15	11	33	129
	15-16	10	32	110
	16-17	10	33	101
	17-18	11	34	98
	18-19	13	39	118

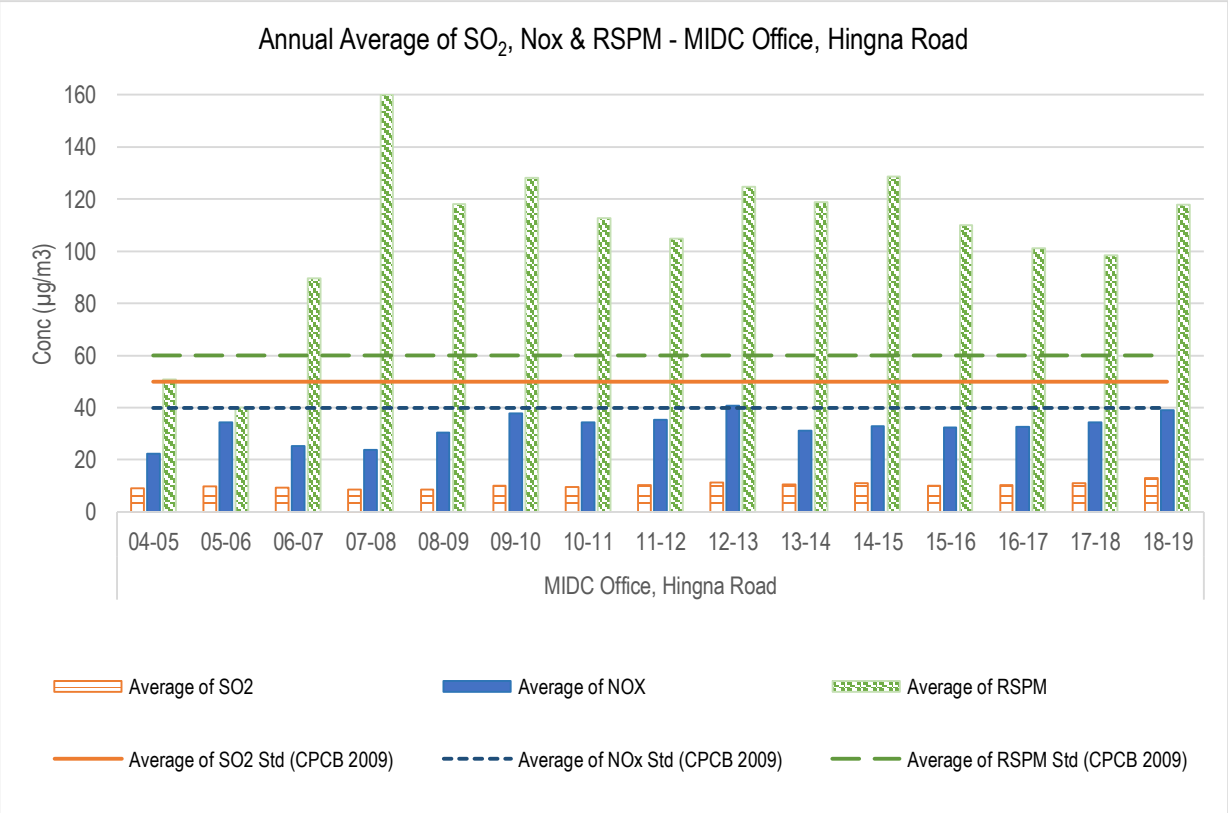


Figure No. 103: Annual average trend of SO_2, NOx, and RSPM at MIDC Office, Hingna Road

Nagpur - Govt. Polytechnic Col, Sadar

Table No. 100: Data for Monthly average reading recorded at Govt. Polytechnic Col, Sadar

Station Name	Year	Month	Average of SO_2(µg/m³)	Average of NOx(µg/m³)	Average of RSPM(µg/m³)
Govt Polytechnic Col, Sadar	2018	Apr	11	36	102
		May	9	29	117
		Jun	9	27	107
		Jul	10	33	123
		Aug	10	34	124
		Sep	11	36	102
		Oct	12	36	130
		Nov	19	47	109
		Dec	13	39	94
	2019	Jan	16	47	95
		Feb	13	42	109
		Mar	16	45	97

Note: Monthly graphs do not have any CPCB Standard[61]

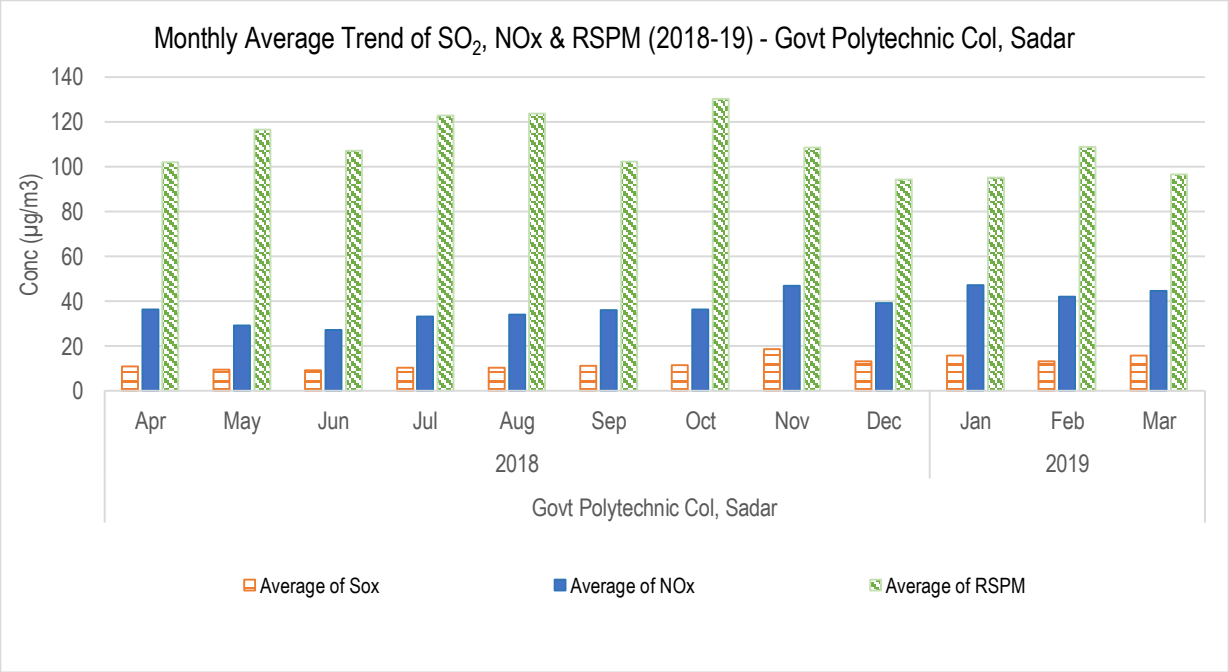


Figure No. 104: Monthly average reading recorded at Govt. Polytechnic Col, Sadar

[61] https://cpcb.nic.in/air-quality-standard/

Table No. 101: Data for Annual average trend of SO_2, NOx, and RSPM at Govt. Polytechnic Col, Sadar

Station Name	Year	Average of SO_2(µg/m³)	Average of NO_X(µg/m³)	Average of RSPM(µg/m³)
Annual Permissible Limit (CPCB)		*50*	*40*	*60*
Govt Polytechnic College, Sadar	04-05	9	21	45
	05-06	9	32	52
	06-07	9	26	70
	07-08	8	21	107
	08-09	8	27	101
	09-10	9	31	93
	10-11	9	30	87
	11-12	9	30	80
	12-13	10	35	82
	13-14	9	28	92
	14-15	10	31	103
	15-16	10	33	91
	16-17	10	30	93
	17-18	10	34	91
	18-19	13	38	109

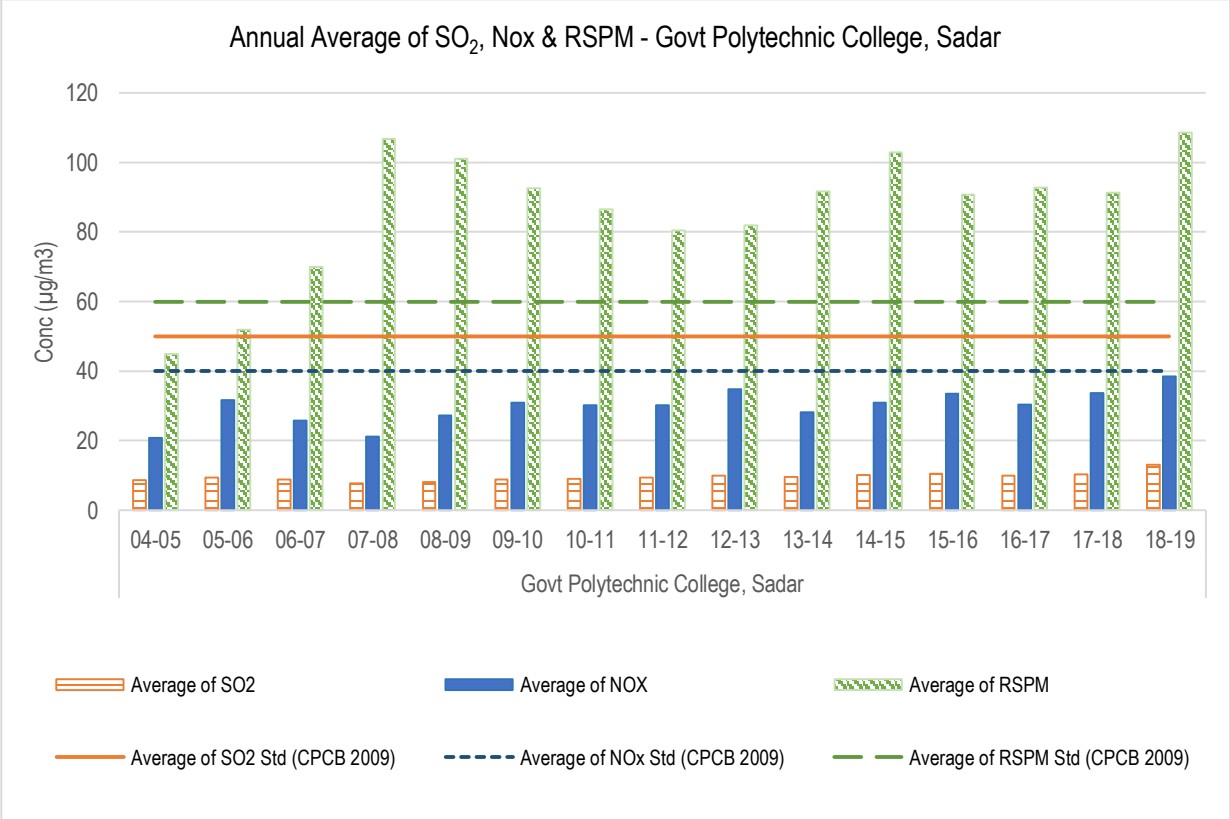


Figure No. 105: Annual average trend of SO_2, NOx, and RSPM at Govt. Polytechnic Col, Sadar

Nagpur - Nagpur Civil Lines

Table No. 102: Data for Monthly average reading recorded at Civil Lines Nagpur

Station Name	Year	Month	Average of SO_2(µg/m³)	Average of NOx(µg/m³)	Average of RSPM(µg/m³)
Civil lines Nagpur	2018	Apr	11	36	52
		May	9	30	64
		Jun	8	24	66
		Jul	9	29	73
		Aug	11	35	68
		Sep	10	35	69
		Oct	11	36	83
		Nov	15	41	99
		Dec	11	34	70
	2019	Jan	13	38	81
		Feb	12	37	69
		Mar	12	37	63

Note: Monthly graphs do not have any CPCB Standard[62]

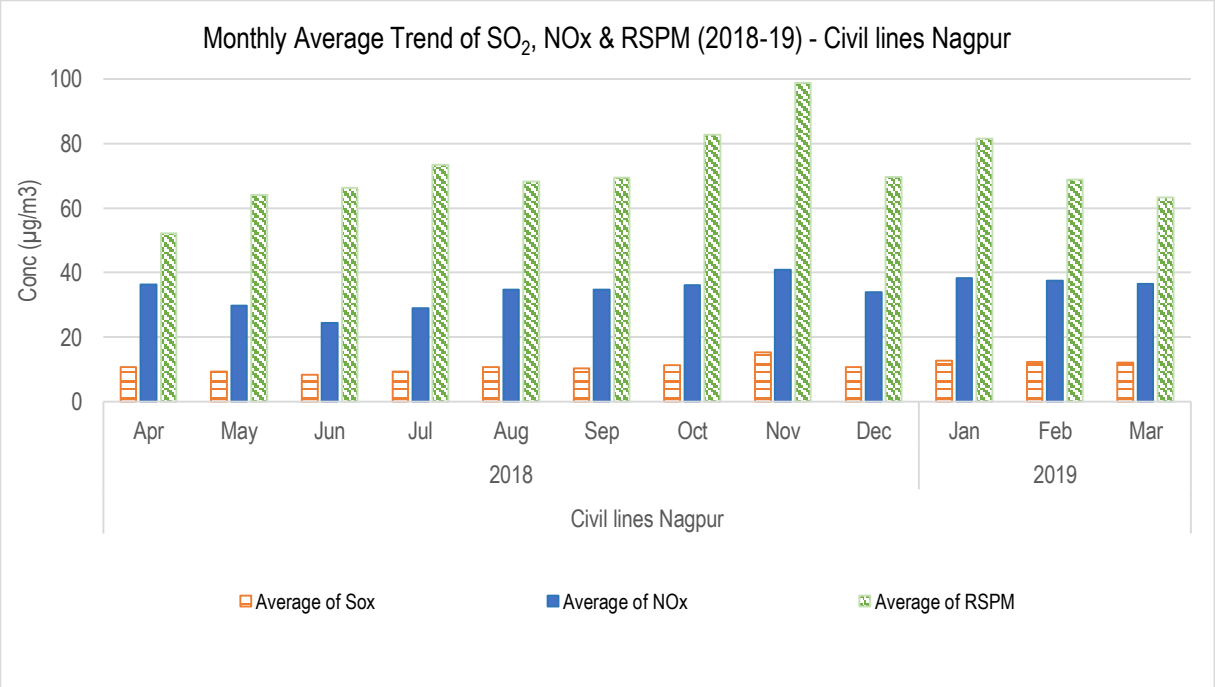


Figure No. 106: Monthly average reading recorded at Civil Lines Nagpur

[62] https://cpcb.nic.in/air-quality-standard/

Table No. 103: Data for Annual average trend of SO_2, NOx, and RSPM at Civil Lines Nagpur

Station Name	Year	Average of SO_2(µg/m³)	Average of NO_X(µg/m³)	Average of RSPM(µg/m3)
Annual Permissible Limit (CPCB)		*50*	*40*	*60*
Civil lines Nagpur	04-05	17	25	53
	05-06	15	22	66
	06-07	14	28	76
	07-08	14	30	70
	08-09	18	31	84
	09-10	13	35	85
	10-11	9	28	66
	11-12	9	26	55
	12-13	9	30	54
	13-14	9	24	61
	14-15	10	28	62
	15-16	9	29	54
	16-17	9	27	62
	17-18	10	30	61
	18-19	11	34	71

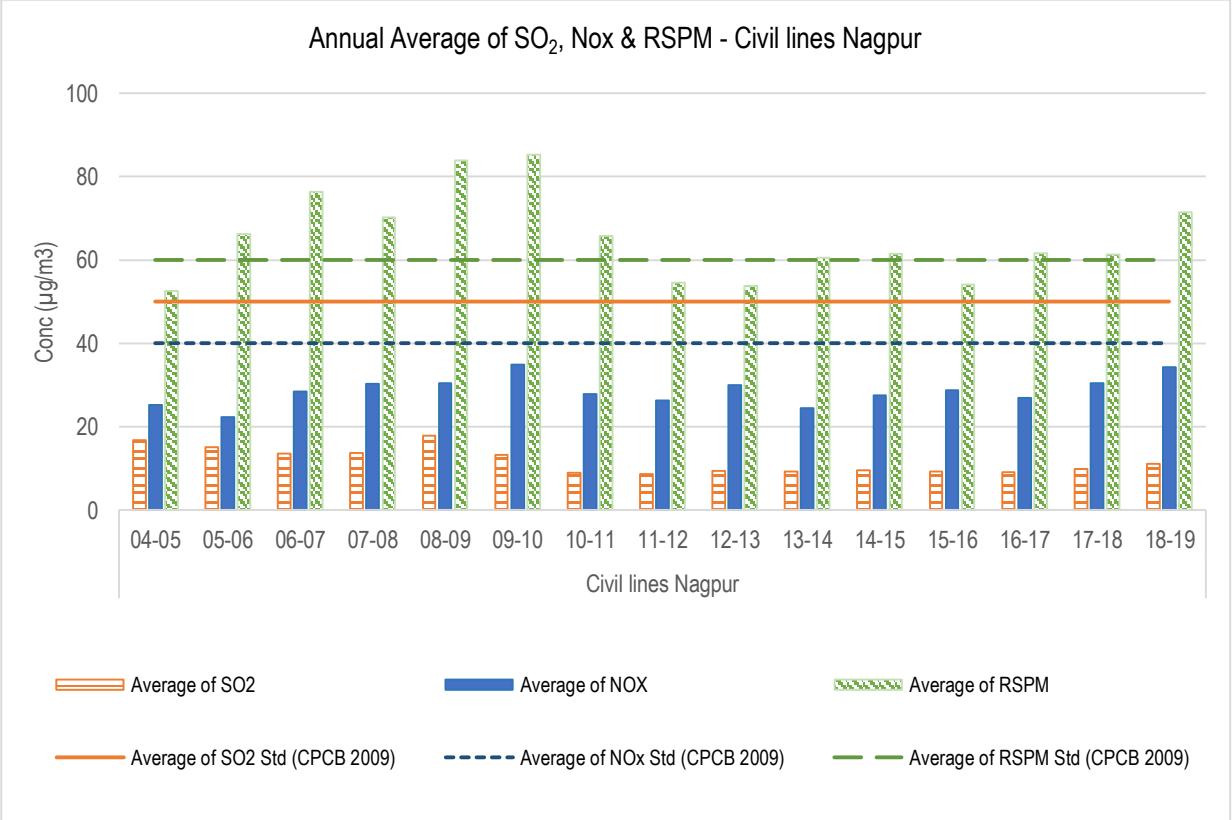


Figure No. 107: Annual average trend of SO_2, NOx, and RSPM at Civil Lines Nagpur

Nagpur - Nagpur CAAQMS

Table No. 104: Data for Monthly average reading recorded at Nagpur CAAQMS

Station Name	Year	Month	Average of SO_2(µg/m³)	Average of NOx(µg/m³)	Average of RSPM(µg/m³)
Nagpur CAAQMS	2018	Apr	15	27	63
		May	15	18	89
		Jun	3	12	63
		Jul	3	15	45
		Aug	3	17	54
		Sep	8	23	59
		Oct	13	43	100
		Nov	13	61	122
		Dec	14	58	125
	2019	Jan	17	70	127
		Feb	15	61	111
		Mar	16	37	98

Note: Monthly graphs do not have any CPCB Standard[63]

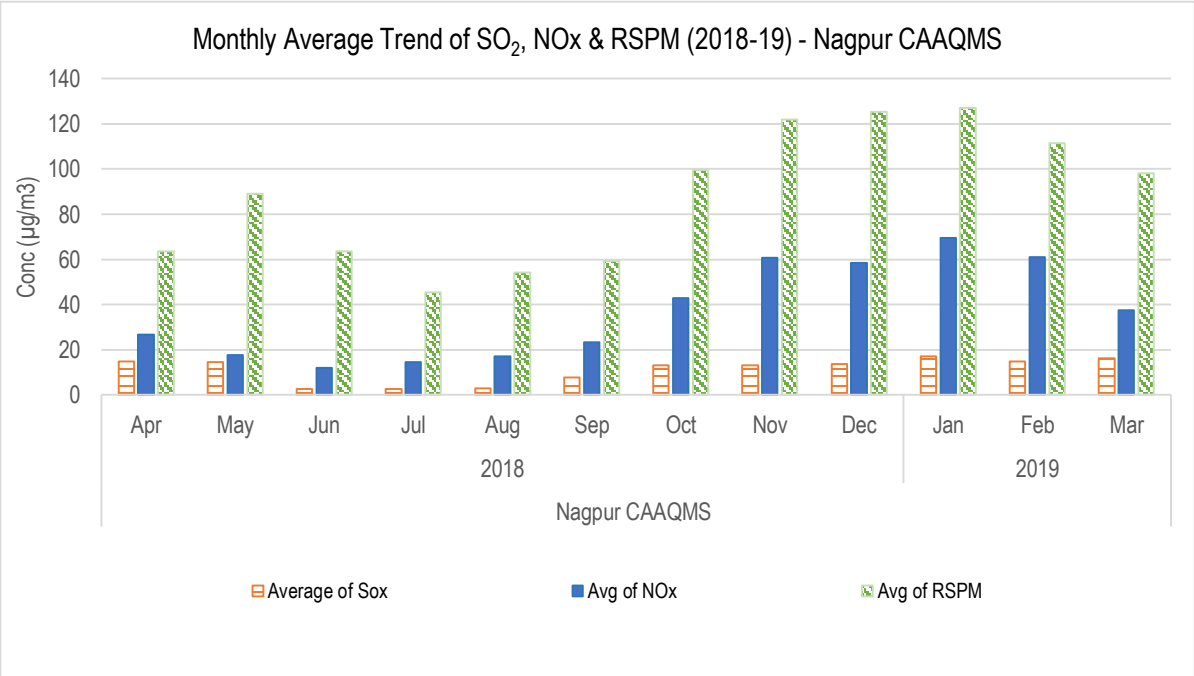


Figure No. 108: Monthly average reading recorded at Nagpur CAAQMS

[63] https://cpcb.nic.in/air-quality-standard/

Table No. 105: Data for Annual average trend of SO_2, NOx, and RSPM at Nagpur CAAQMS

Station Name	Year	Average of SO_2(µg/m³)	Average of NO_X(µg/m³)	Average of RSPM(µg/m³)
Annual Permissible Limit (CPCB)		*50*	*40*	*60*
Nagpur CAAQMS	16-17	10	42	71
	17-18	9	19	70
	18-19	11	38	88

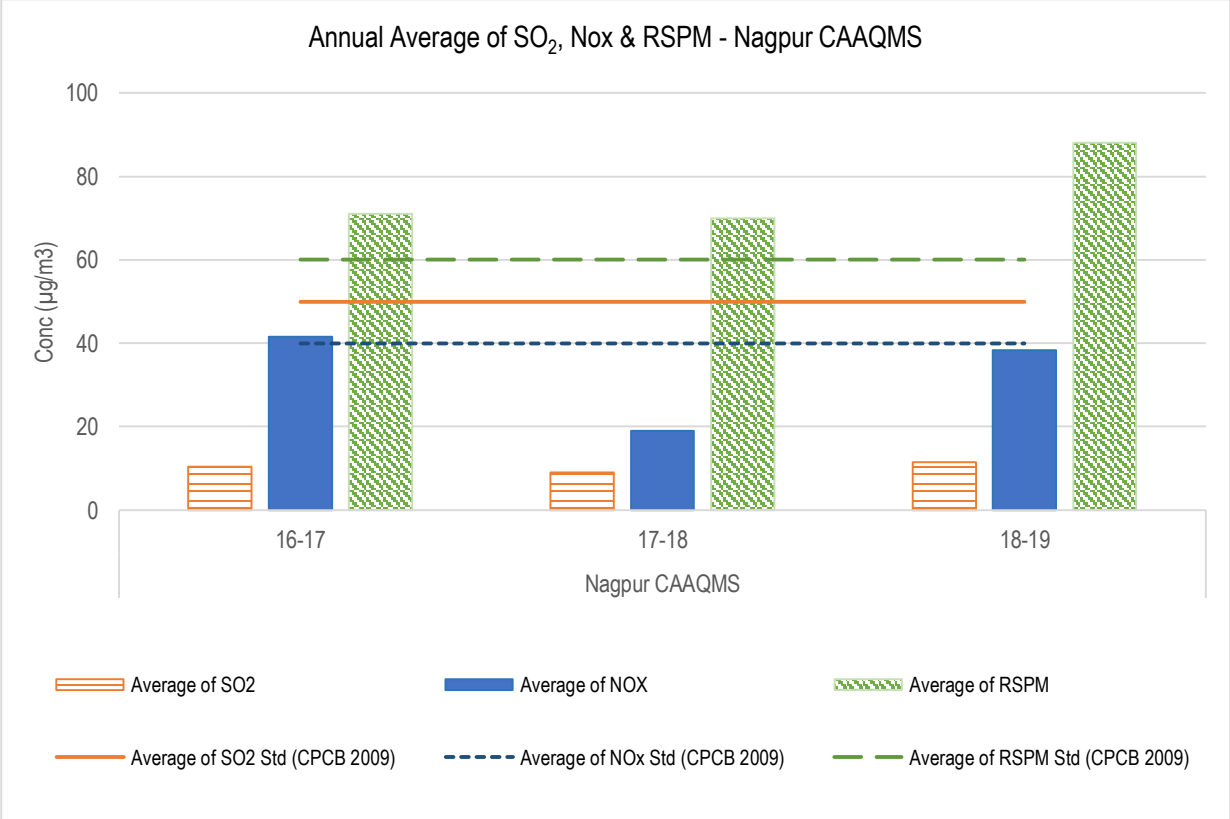
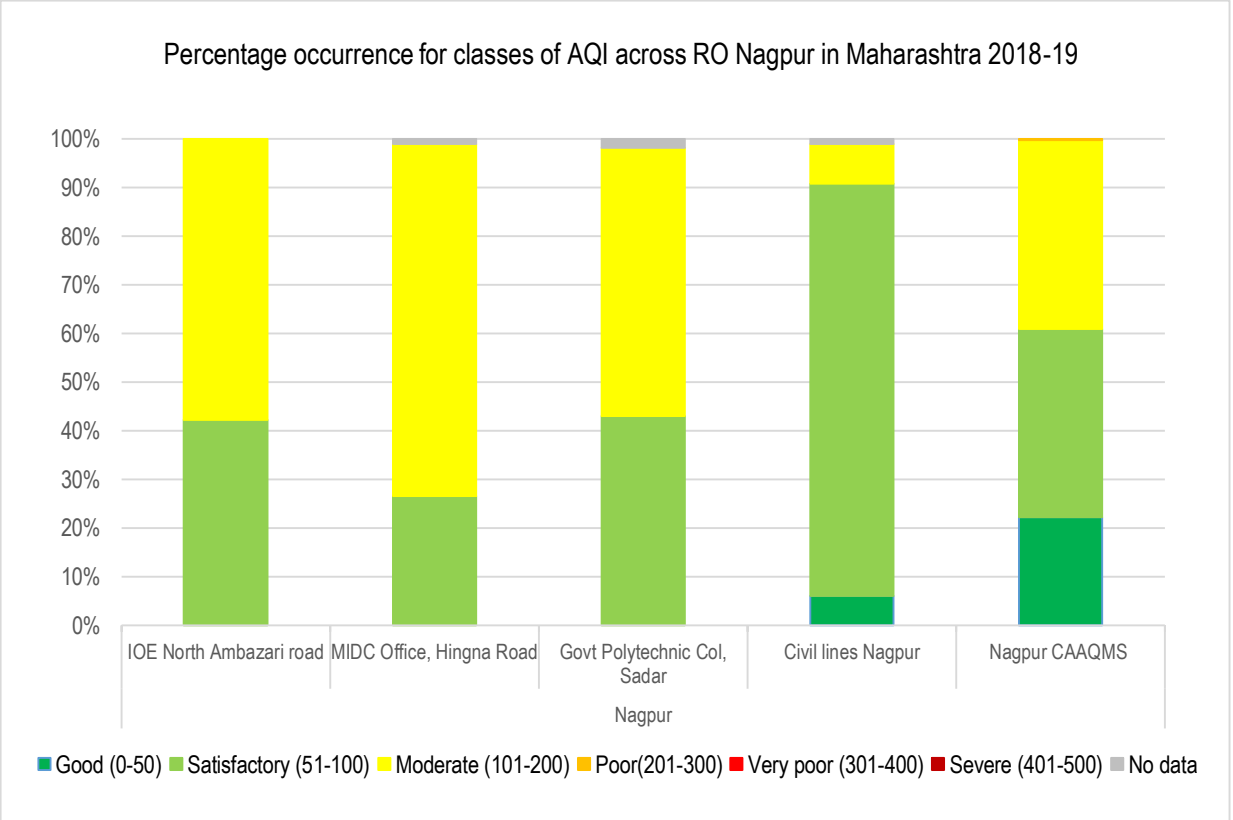


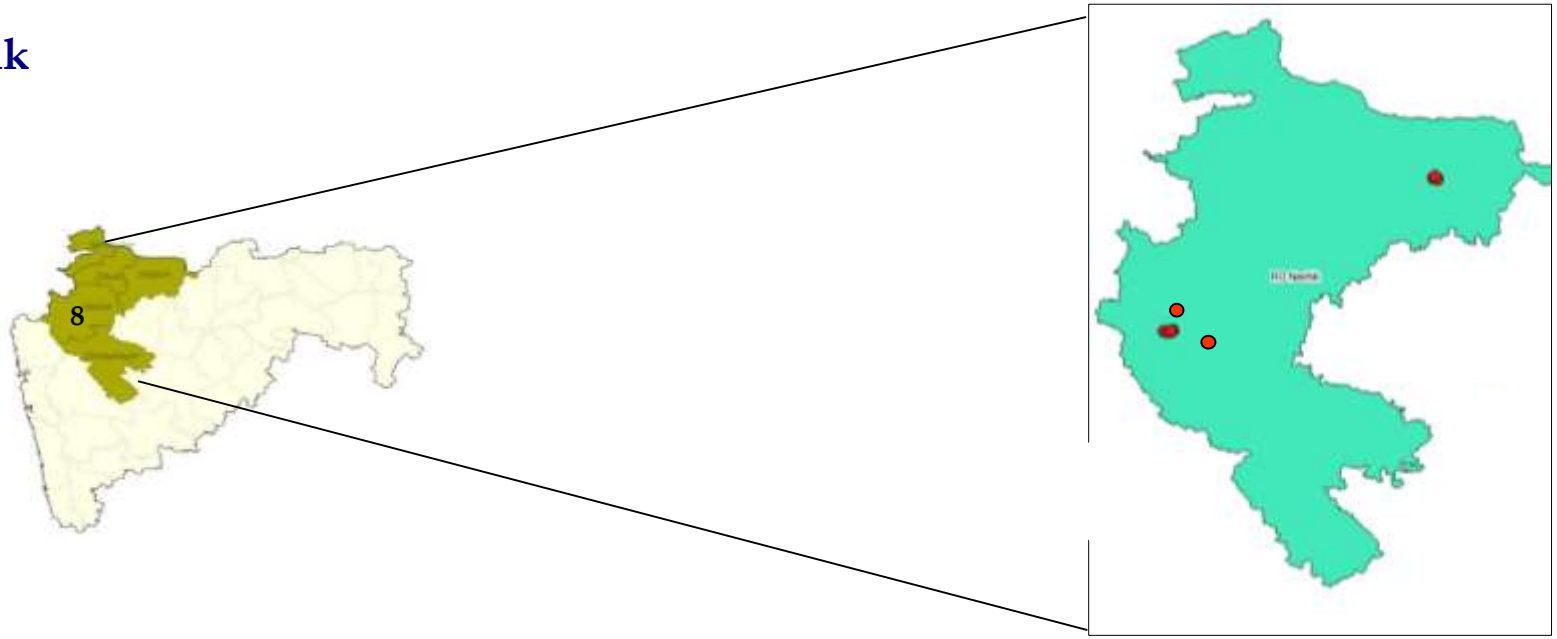
Figure No. 109: Annual average trend of SO_2, NOx, and RSPM at Nagpur CAAQMS

Table No. 106: Percentage exceedance of pollutants at Nagpur RO

Station Name	Total Observations	Exceedence			% Exceedence		
		SO_2	NOx	RSPM	SO_2	NOx	RSPM
IOE North Ambazari road	118	0	35	116	0	30	100
MIDC Office, Hingna Road	101	0	39	96	0	39	98
Govt Polytechnic Col, Sadar	114	0	37	112	0	32	98
Civil lines Nagpur	320	0	44	218	0	14	69
Nagpur CAAQMS	363	0	128	260	0	38	72



RO - Nashik



MPCB RO	Region	Station code	Station name	Type	Latitude (deg)	Longitude (deg)
Nashik	Jalgaon	644	Old B. J. Market	Residential	21° 00' 37.2" N	75° 34' 01.4" E
	Jalgaon	645	Girna Water Tank	Residential	20° 59' 49.3" N	75° 33' 04.7" E
	Jalgaon	646	MIDC Jalgaon	Industrial	20° 59' 20.2" N	75° 35' 04.1" E
	Nashik	259	RTO Colony	Residential	19° 59' 48.9" N	73° 46' 35.3" E
	Nashik	269	MIDC Satpur - VIP	Industrial	19° 59' 54.2" N	73° 43' 41.2" E
	Nashik	280	NMC Nashik	Residential	20° 00' 00.0" N	73° 46' 36.2" E
	Nashik	710	SRO Office Nashik	Residential	19° 59' 32.9" N	73° 45' 01.1" E
	Nashik		Nashik CAAQMS	Commercial	20° 00'26.51"N	73° 46' 42.56"E

Jalgaon - Old B. J. Market

Table No. 107: Data for Monthly average reading recorded at Old B. J. Market

Station Name	Year	Month	Average of SO_2(µg/m³)	Average of NOx(µg/m³)	Average of RSPM(µg/m³)
Old B. J. Market	2018	Apr	14	34	78
		May	13	34	80
		Jun	12	31	62
		Jul	11	29	55
		Aug	12	31	73
		Sep	13	33	75
		Oct	14	35	74
		Nov	15	37	90
		Dec	14	35	72
	2019	Jan	14	35	58
		Feb	13	34	64
		Mar	13	34	60

Note: Monthly graphs do not have any CPCB Standard[64]

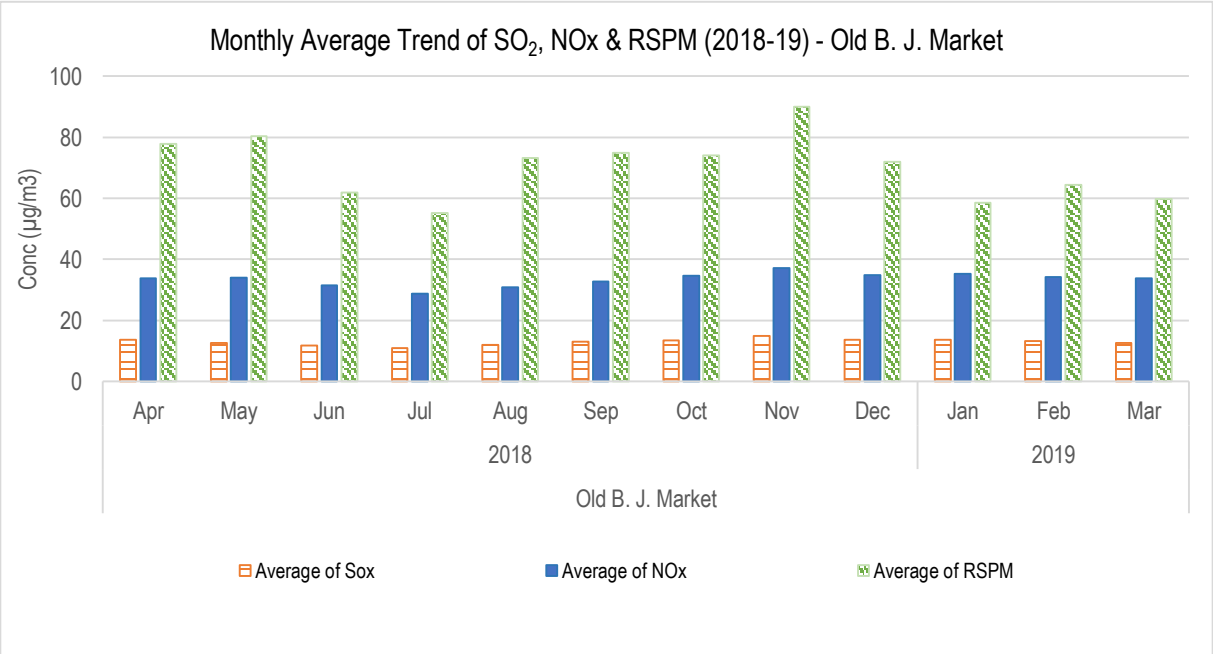


Figure No. 110: Monthly average reading recorded at Old B. J. Market

[64] https://cpcb.nic.in/air-quality-standard/

Table No. 108: Data for Annual average trend of SO_2, NOx, and RSPM at Old B. J. Market

Station Name	Year	Average of SO_2(µg/m³)	Average of NO_X(µg/m³)	Average of RSPM(µg/m³)
Annual Permissible Limit (CPCB)		*50*	*40*	*60*
Old B. J. Market	08-09	14	48	117
	09-10	15	45	109
	10-11	18	45	122
	11-12	16	43	111
	12-13	18	44	123
	13-14	19	41	118
	14-15	18	42	111
	15-16	14	38	108
	16-17	14	36	96
	17-18	13	30	72
	18-19	13	34	72

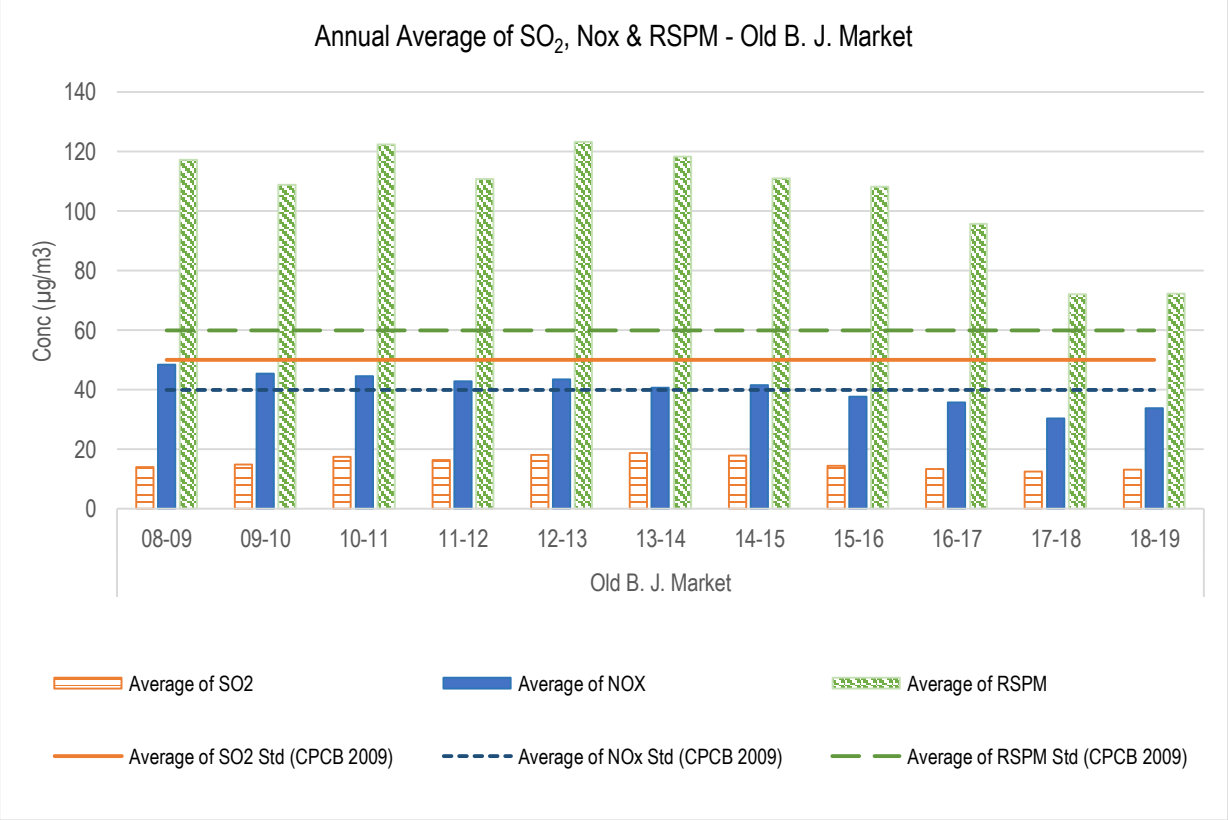


Figure No. 111: Annual average trend of SO_2, NOx, and RSPM at Old B. J. Market

Jalgaon - Girna Water Tank

Table No. 109: Data for Monthly average reading recorded at Girna Water Tank

Station Name	Year	Month	Average of SO_2(µg/m³)	Average of NOx(µg/m³)	Average of RSPM(µg/m³)
Girna Water Tank	2018	Apr	14	34	81
		May	13	33	79
		Jun	12	31	61
		Jul	10	28	50
		Aug	11	30	62
		Sep	12	33	69
		Oct	13	33	70
		Nov	15	37	89
		Dec	13	34	69
	2019	Jan	14	35	55
		Feb	13	35	59
		Mar	13	33	55

Note: Monthly graphs do not have any CPCB Standard[65]

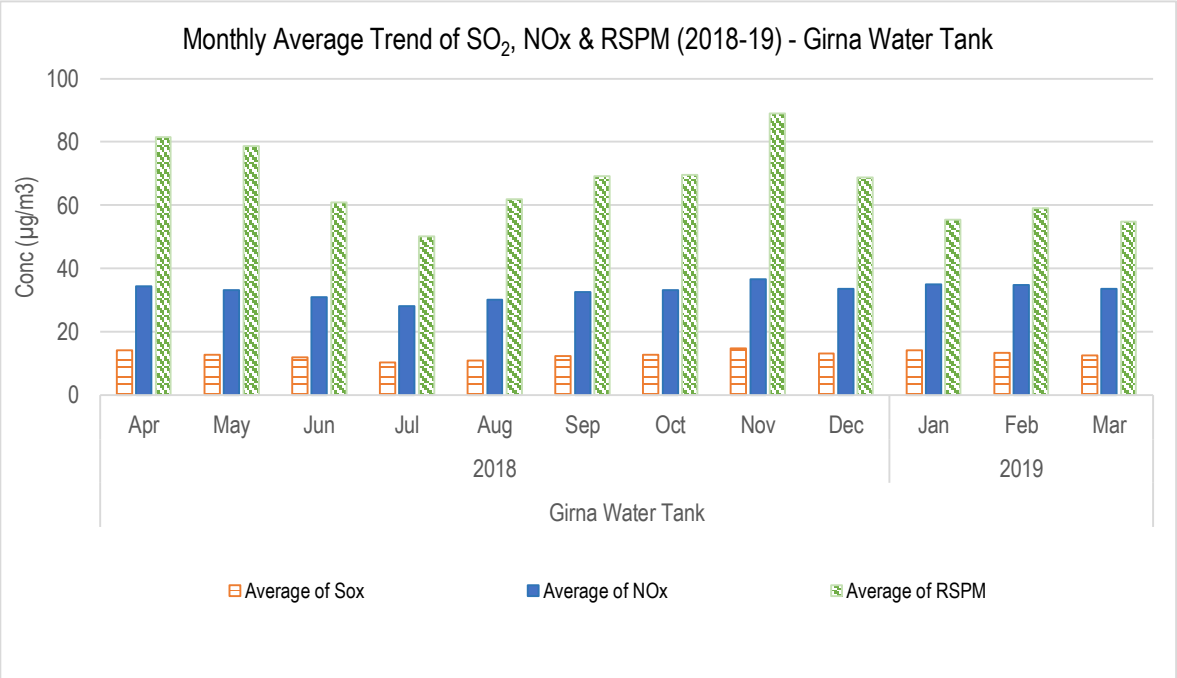


Figure No. 112: Monthly average reading recorded at Girna Water Tank

[65] https://cpcb.nic.in/air-quality-standard/

Table No. 110: Data for Annual average trend of SO_2, NOx, and RSPM at Girna Water Tank

Station Name	Year	Average of SO_2(µg/m³)	Average of NO_X(µg/m³)	Average of RSPM(µg/m³)
Annual Permissible Limit (CPCB)		*50*	*40*	*60*
Girna Water Tank	08-09	11	40	102
	09-10	13	43	110
	10-11	16	42	122
	11-12	13	38	116
	12-13	16	40	124
	13-14	17	37	116
	14-15	16	39	112
	15-16	13	33	103
	16-17	13	34	92
	17-18	12	29	70
	18-19	13	33	69

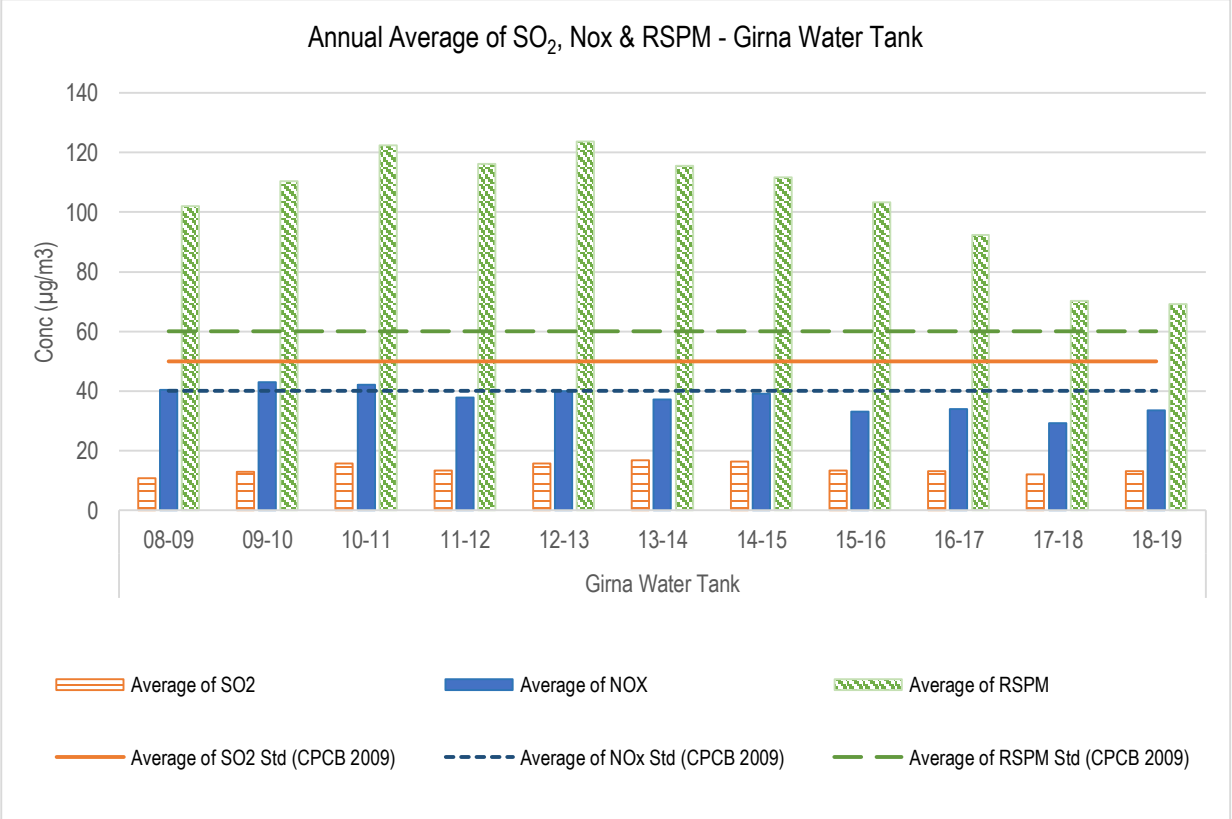


Figure No. 113: Annual average trend of SO_2, NOx, and RSPM at Girna Water Tank

Jalgaon - MIDC Jalgaon

Table No. 111: Data for Monthly average reading recorded at MIDC Jalgaon

Station Name	Year	Month	Average of SO_2(µg/m³)	Average of NOx(µg/m³)	Average of RSPM(µg/m³)
MIDC Jalgaon	2018	Apr	13	33	75
		May	14	34	83
		Jun	13	32	71
		Jul	11	30	53
		Aug	12	32	70
		Sep	13	33	76
		Oct	14	36	76
		Nov	15	37	91
		Dec	14	35	75
	2019	Jan	15	36	62
		Feb	14	36	69
		Mar	14	35	68

Note: Monthly graphs do not have any CPCB Standard[66]

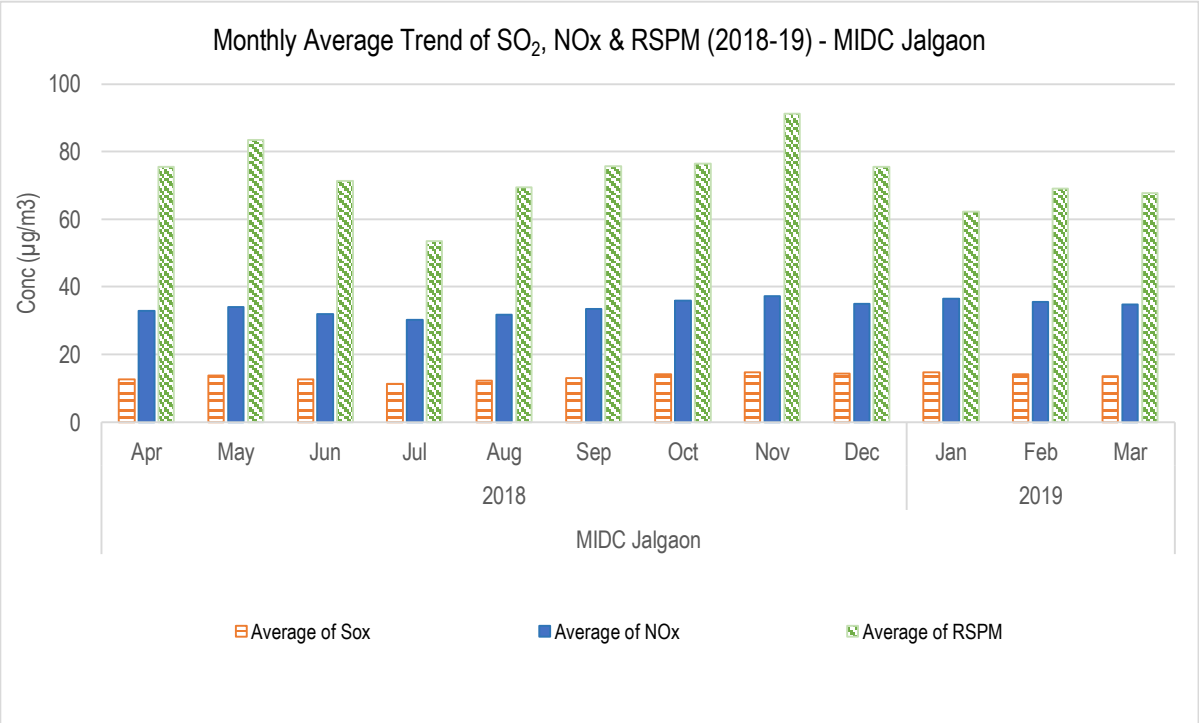


Figure No. 114: Monthly average reading recorded at MIDC Jalgaon

[66] https://cpcb.nic.in/air-quality-standard/

Table No. 112: Data for Annual average trend of SO_2, NOx, and RSPM at MIDC Jalgaon

Station Name	Year	Average of SO_2(µg/m³)	Average of NO_X(µg/m³)	Average of RSPM(µg/m³)
Annual Permissible Limit (CPCB)		*50*	*40*	*60*
MIDC Jalgaon	08-09	15	54	120
	09-10	16	49	120
	10-11	22	51	142
	11-12	22	49	137
	12-13	24	51	150
	13-14	23	45	132
	14-15	20	48	125
	15-16	16	41	114
	16-17	14	37	100
	17-18	13	32	78
	18-19	14	35	75

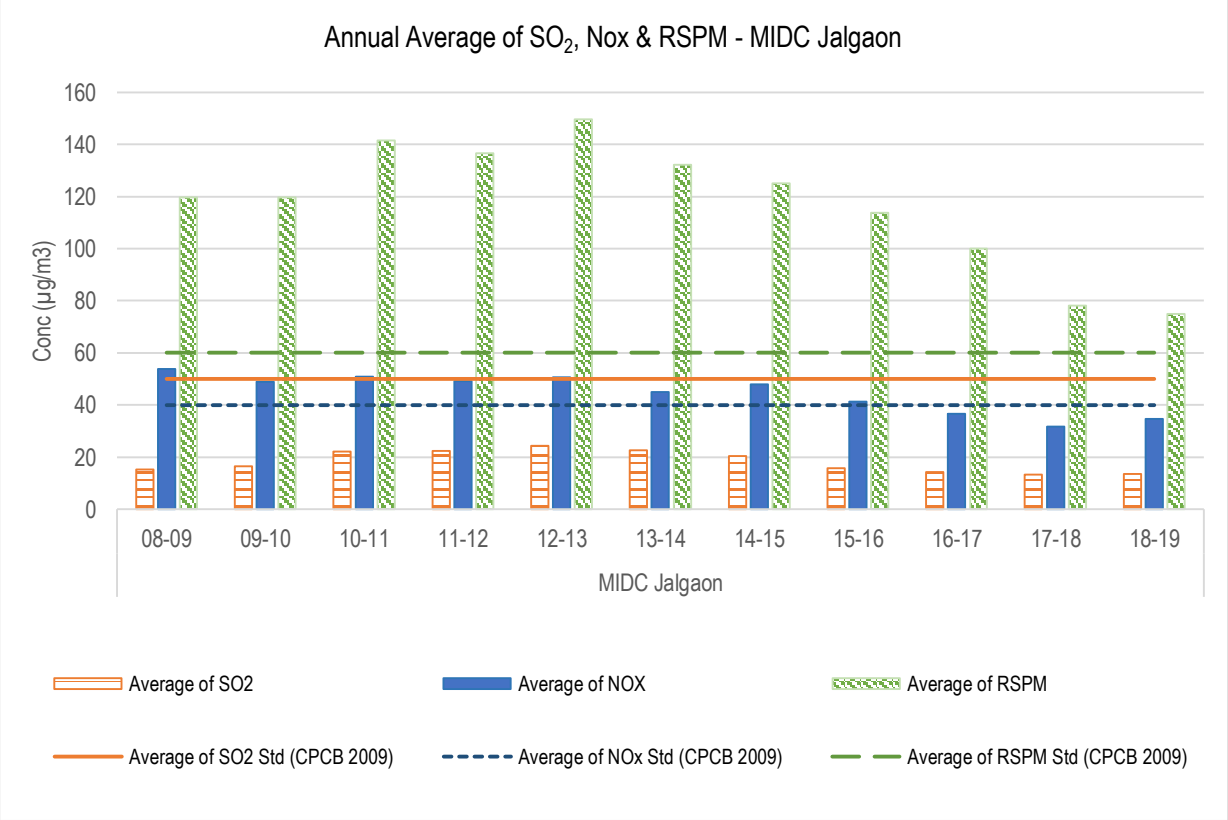


Figure No. 115: Annual average trend of SO_2, NOx, and RSPM at MIDC Jalgaon

Nashik - RTO Colony

Table No. 113: Data for Monthly average reading recorded at RTO Colony

Station Name	Year	Month	Average of SO_2(µg/m³)	Average of NOx(µg/m³)	Average of RSPM(µg/m³)
RTO Colony	2018	Apr	13	15	129
		May	11	20	86
		Jun	9	20	69
		Jul	8	22	59
		Aug	12	24	69
		Sep	15	26	70
		Oct	15	24	78
		Nov	9	20	64
		Dec	18	24	57
	2019	Jan	14	29	60
		Feb	8	19	63
		Mar	15	33	109

Note: Monthly graphs do not have any CPCB Standard[67]

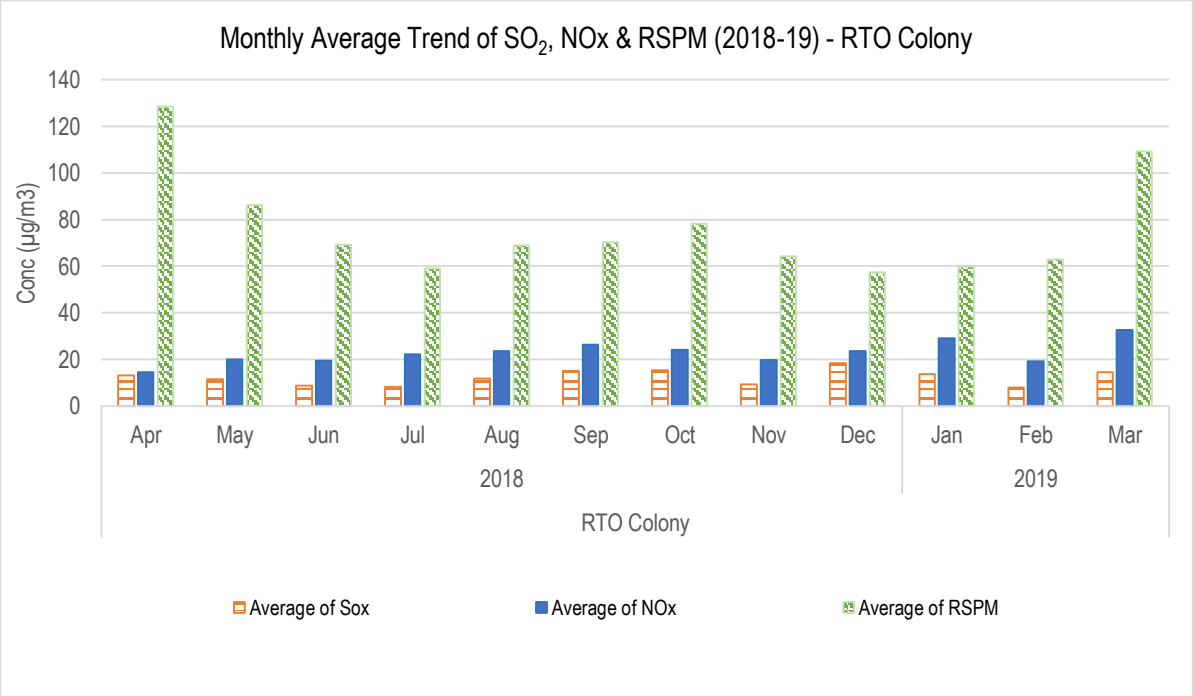


Figure No. 116: Monthly average reading recorded at RTO Colony

[67] https://cpcb.nic.in/air-quality-standard/

Table No. 114: Data for Annual average trend of SO_2, NOx, and RSPM at RTO Colony

Station Name	Year	Average of SO_2(µg/m³)	Average of NO_X(µg/m³)	Average of RSPM(µg/m³)
Annual Permissible Limit (CPCB)		*50*	*40*	*60*
RTO Colony	04-05	33	25	79
	05-06	29	25	92
	06-07	32	26	51
	07-08	34	27	42
	08-09	26	25	88
	09-10	21	29	81
	10-11	21	23	75
	11-12	24	28	98
	12-13	25	27	90
	13-14	28	28	71
	14-15	24	26	77
	15-16	14	23	73
	16-17	12	25	83
	17-18	10	20	93
	18-19	12	23	76

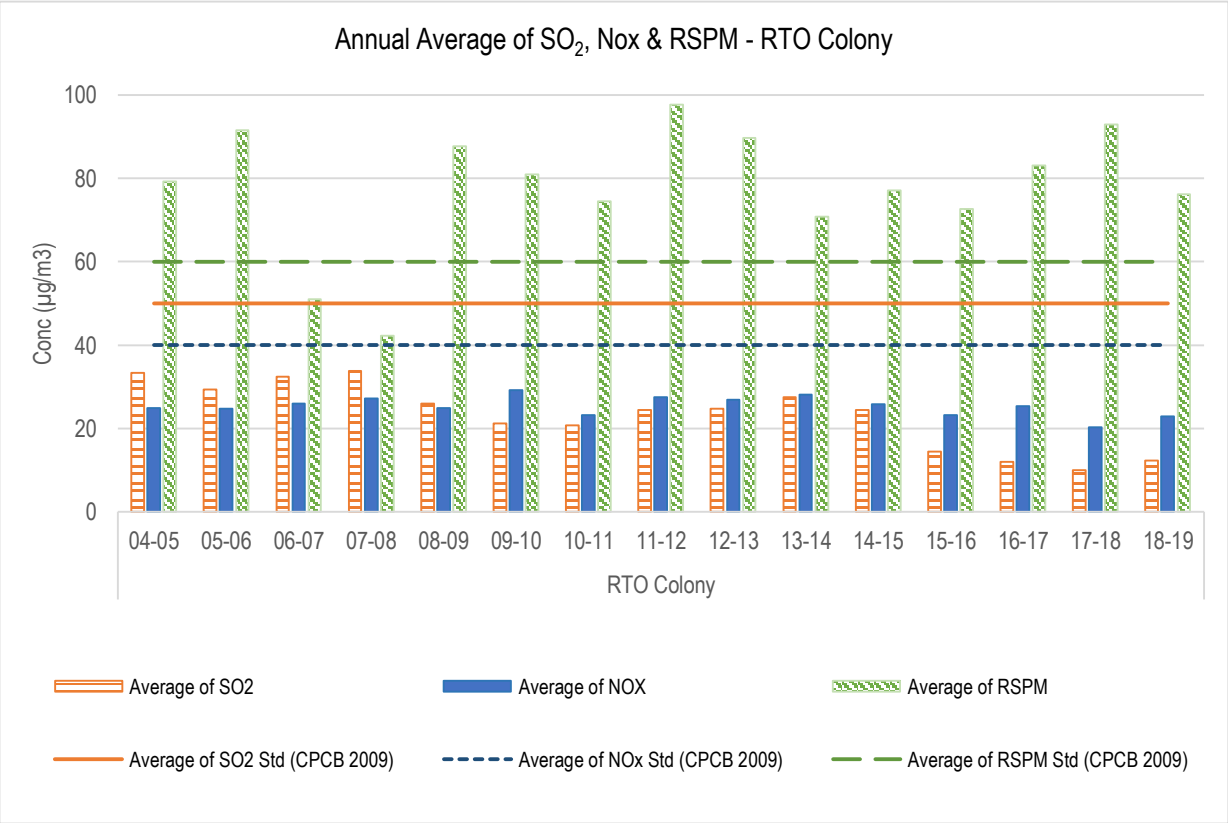


Figure No. 117: Annual average trend of SO_2, NOx, and RSPM at RTO Colony

Nashik - MIDC Satpur - VIP

Table No. 115: Data for Monthly average reading recorded at MIDC Satpur - VIP

Station Name	Year	Month	Average of SO_2(µg/m³)	Average of NOx(µg/m³)	Average of RSPM(µg/m³)
MIDC Satpur - VIP	2018	Apr	14	18	120
		May	12	20	103
		Jun	9	22	73
		Jul	8	22	57
		Aug	11	24	69
		Sep	15	26	72
		Oct	16	24	79
		Nov	11	22	64
		Dec	17	23	55
	2019	Jan	14	28	57
		Feb	8	18	80
		Mar	14	33	117

Note: Monthly graphs do not have any CPCB Standard[68]

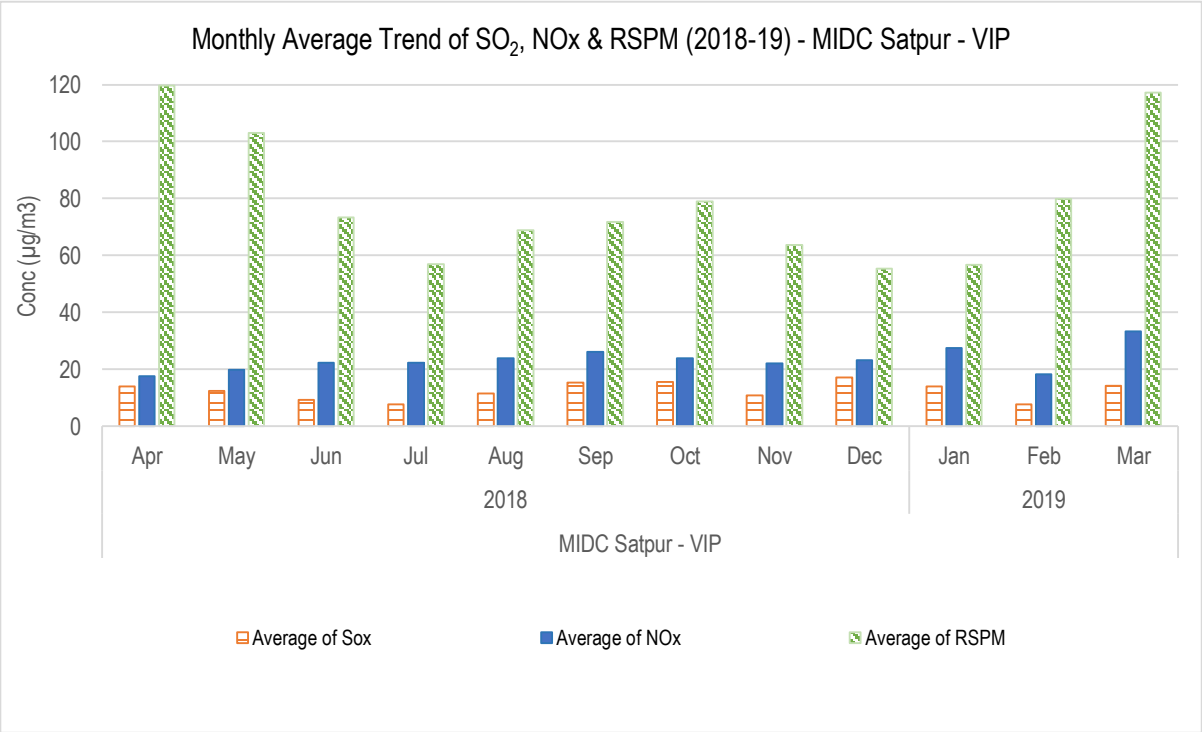


Figure No. 118: Monthly average reading recorded at MIDC Satpur - VIP

[68] https://cpcb.nic.in/air-quality-standard/

Table No. 116: Data for Annual average trend of SO_2, NOx, and RSPM at MIDC Satpur - VIP

Station Name	Year	Average of SO_2(µg/m³)	Average of NO_X(µg/m³)	Average of RSPM(µg/m³)
Annual Permissible Limit (CPCB)		*50*	*40*	*60*
MIDC Satpur - VIP	04-05	36	27	90
	05-06	33	28	98
	06-07	34	28	58
	07-08	41	34	52
	08-09	30	27	91
	09-10	23	29	85
	10-11	23	25	70
	11-12	25	28	98
	12-13	25	27	92
	13-14	27	28	71
	14-15	25	26	80
	15-16	14	22	78
	16-17	11	24	88
	17-18	10	19	81
	18-19	12	24	78

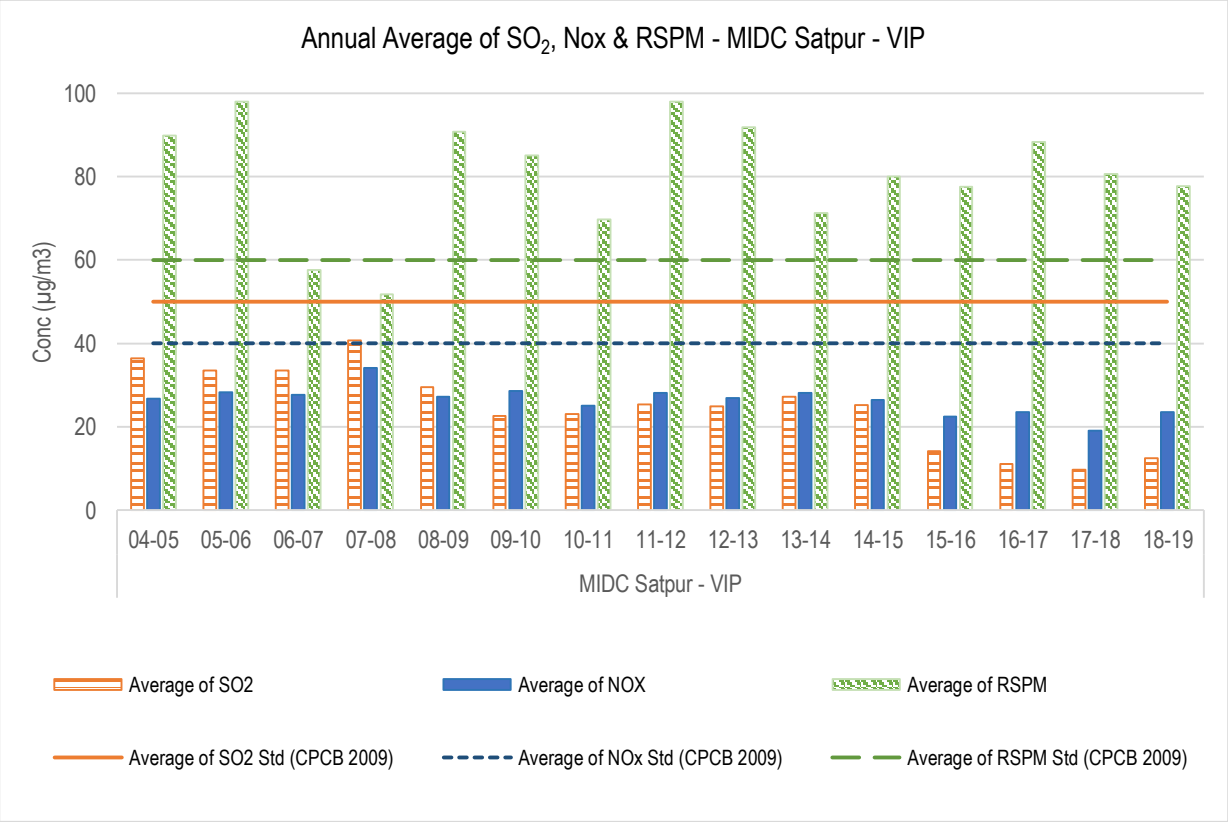


Figure No. 119: Annual average trend of SO_2, NOx, and RSPM at MIDC Satpur - VIP

Nashik - NMC Nashik

Table No. 117: Data for Monthly average reading recorded at NMC Nashik

Station Name	Year	Month	Average of SO_2(µg/m³)	Average of NOx(µg/m³)	Average of RSPM(µg/m³)
NMC Nashik	2018	Apr	14	15	118
		May	13	19	100
		Jun	9	20	81
		Jul	8	23	61
		Aug	12	24	63
		Sep	16	26	72
		Oct	15	24	77
		Nov	8	22	60
		Dec	19	24	58
	2019	Jan	13	29	60
		Feb	7	19	58
		Mar	15	33	119

Note: Monthly graphs do not have any CPCB Standard[69]

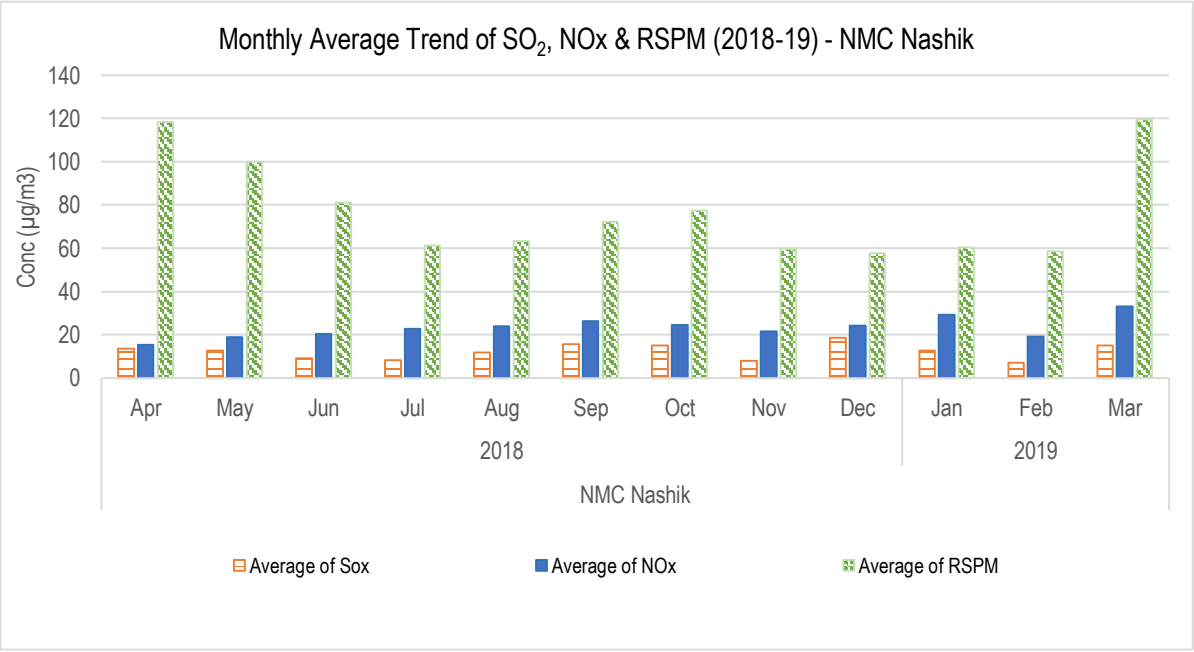


Figure No. 120: Monthly average reading recorded at NMC Nashik

[69] https://cpcb.nic.in/air-quality-standard/

Table No. 118: Data for Annual average trend of SO_2, NOx, and RSPM at NMC Nashik

Station Name	Year	Average of SO_2(µg/m³)	Average of NO_X(µg/m³)	Average of RSPM(µg/m³)
		50	*40*	*60*
NMC Nashik	13-14	28	28	70
	14-15	25	26	78
	15-16	15	24	94
	16-17	12	26	97
	17-18	10	20	100
	18-19	12	23	77

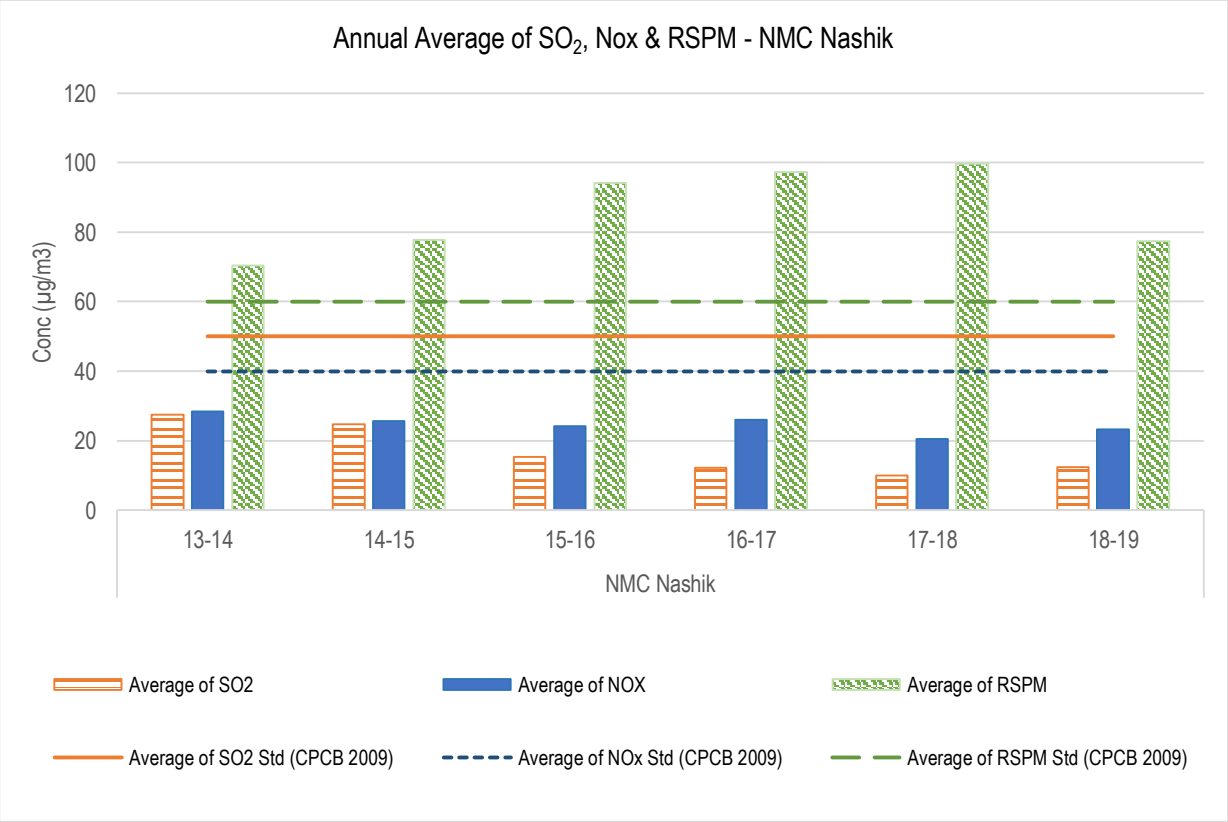


Figure No. 121: Annual average trend of SO_2, NOx, and RSPM at NMC Nashik

Nashik - SRO Office Nashik

Table No. 119: Data for Monthly average reading recorded a SRO Office Nashik

Station Name	Year	Month	Average of SO_2(µg/m³)	Average of NOx(µg/m³)	Average of RSPM(µg/m³)
SRO Office Nashik	2018	Apr	15	16	114
		May	14	19	74
		Jun	9	21	61
		Jul	8	23	54
		Aug	12	24	64
		Sep	15	26	72
		Oct	16	24	78
		Nov	10	21	67
		Dec	15	21	57
	2019	Jan	10	28	60
		Feb	9	21	73
		Mar	15	32	109

Note: Monthly graphs do not have any CPCB Standard[70]

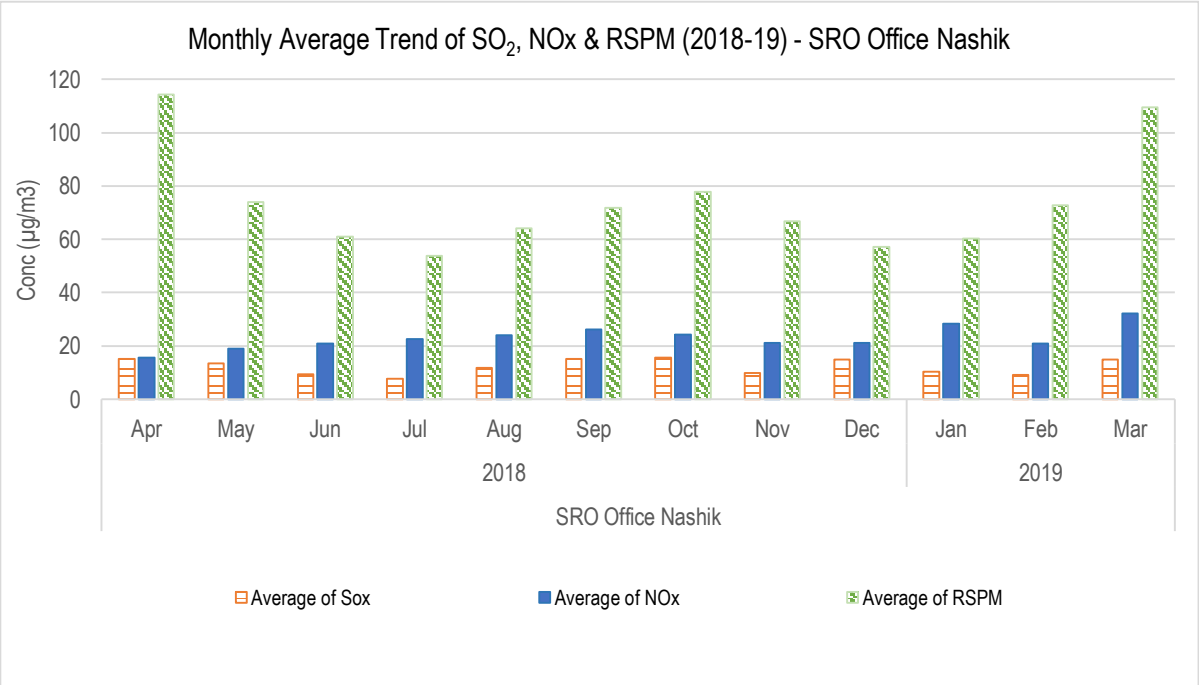


Figure No. 122: Monthly average reading recorded at SRO Office Nashik

[70] https://cpcb.nic.in/air-quality-standard/

Table No. 120: Data for Annual average trend of SO_2, NOx, and RSPM at SRO Office Nashik

Station Name	Year	Average of SO_2(µg/m³)	Average of NO_X(µg/m³)	Average of RSPM(µg/m³)
Annual Permissible Limit (CPCB)		*50*	*40*	*60*
SRO Office Nashik	04-05	19	31	69
	05-06	14	27	78
	06-07	16	27	102
	07-08	17	26	114
	08-09	23	29	104
	09-10	21	27	86
	10-11	20	23	85
	11-12	24	28	114
	12-13	24	27	90
	13-14	28	28	78
	14-15	26	26	73
	15-16	15	24	76
	16-17	11	26	72
	17-18	10	21	80
	18-19	12	23	73

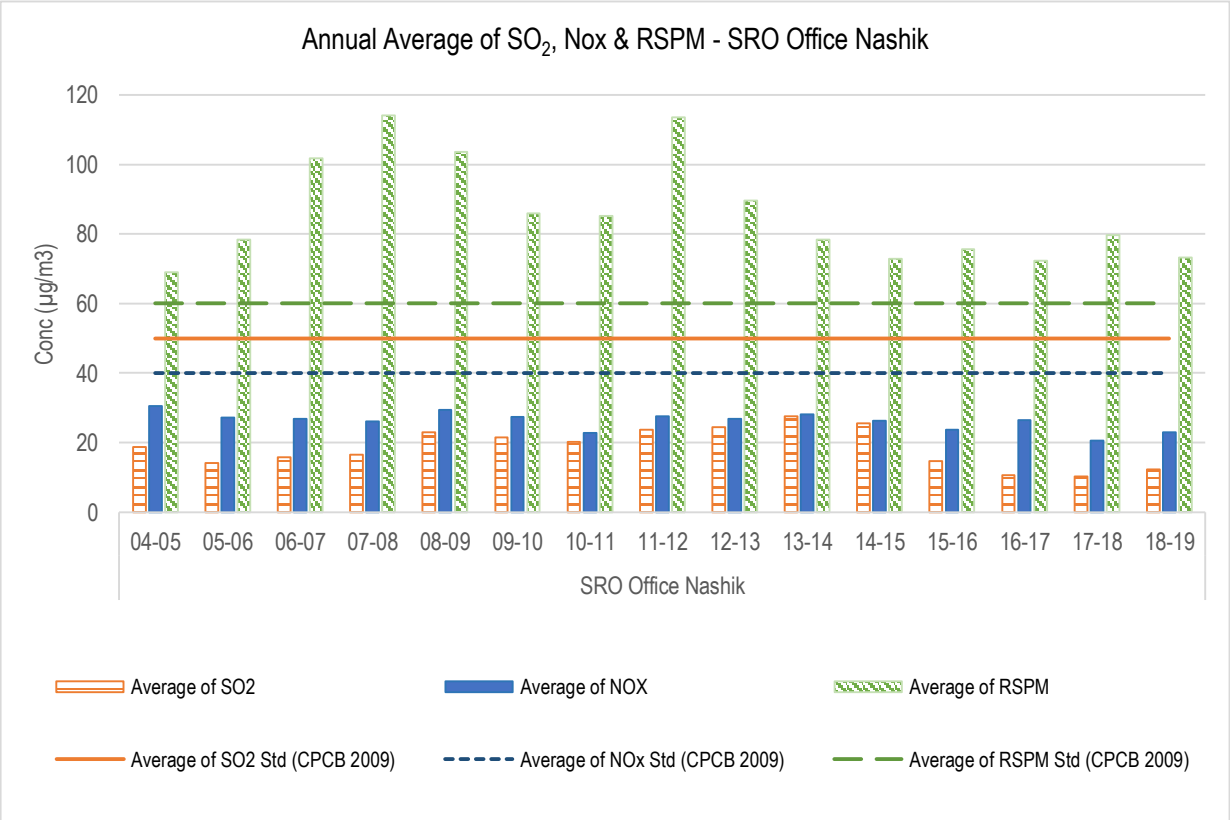


Figure No. 123: Annual average trend of SO_2, NOx, and RSPM at SRO Office Nashik

Nashik - Nashik CAAQMS

Table No. 121: Data for Monthly average reading recorded at Nashik CAAQMS

Station Name	Year	Month	Average of SO_2(µg/m³)	Average of NOx(µg/m³)	Average of RSPM(µg/m³)
Nashik CAAQMS	2018	Apr	4	11	83
		May	2	12	73
		Jun	2	11	52
		Jul	3	5	39
		Aug	4	5	46
		Sep	3	11	46
		Oct	5	16	77
		Nov	8	25	85
		Dec	7	25	76
	2019	Jan	8	25	91
		Feb	6	19	86
		Mar	6	13	82

Note: Monthly graphs do not have any CPCB Standard[71]

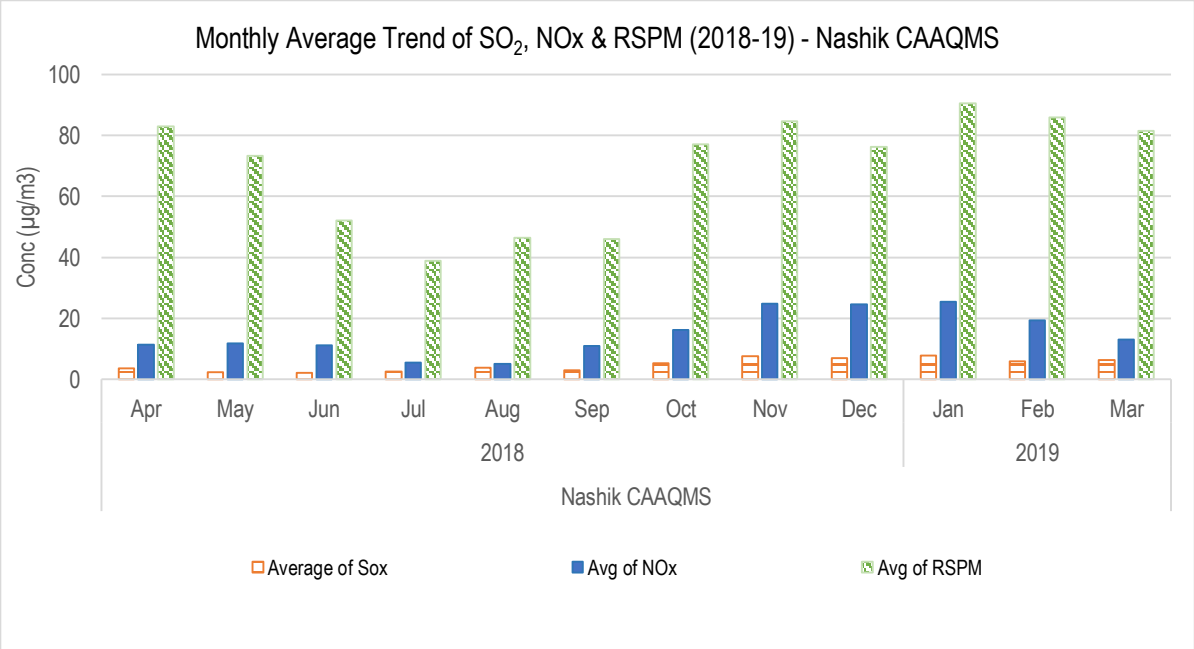


Figure No. 124: Monthly average reading recorded at Nashik CAAQMS

[71] https://cpcb.nic.in/air-quality-standard/

Table No. 122: Data for Annual average trend of SO_2, NOx, and RSPM at Nashik CAAQMS

Station Name	Year	Average of SO_2	Average of NO_X	Average of RSPM
Annual Permissible Limit (CPCB)		*50*	*40*	*60*
Nashik CAAQMS	16-17	6	33	64
	17-18	5	17	63
	18-19	5	19	70

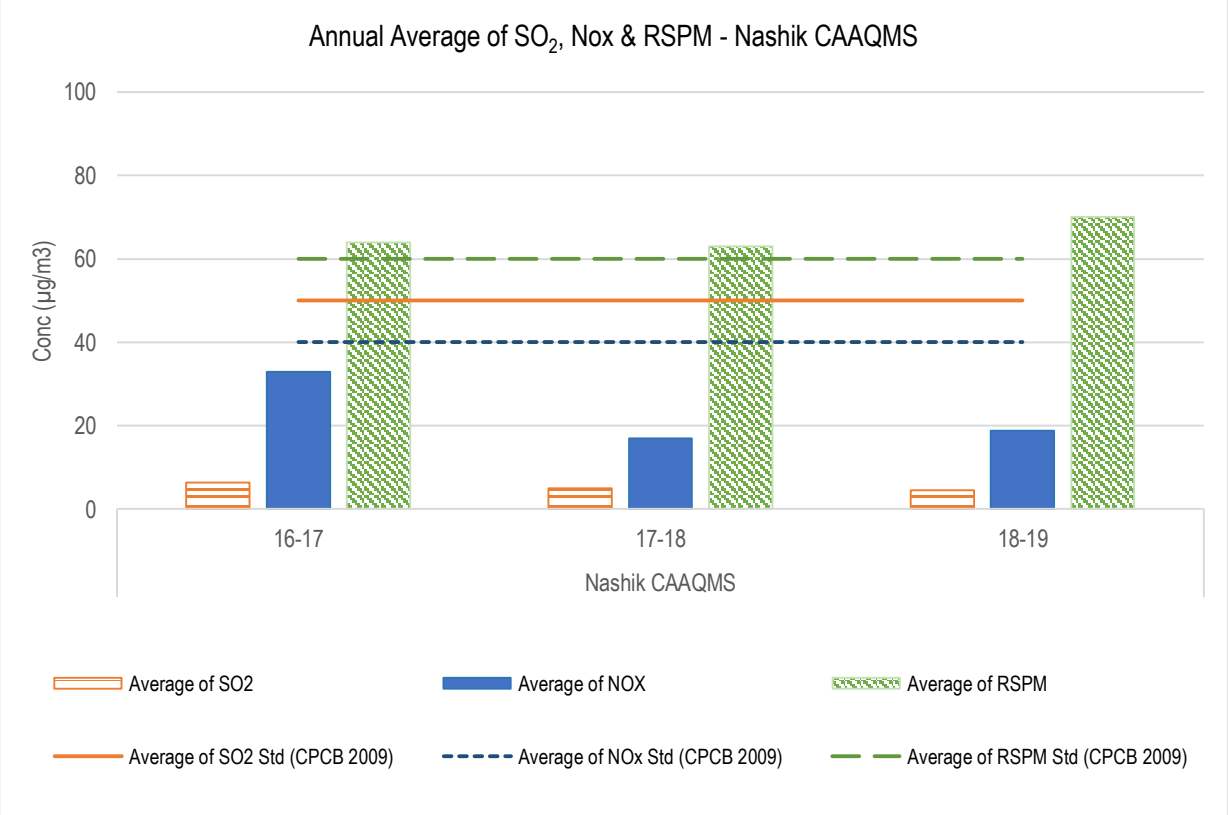
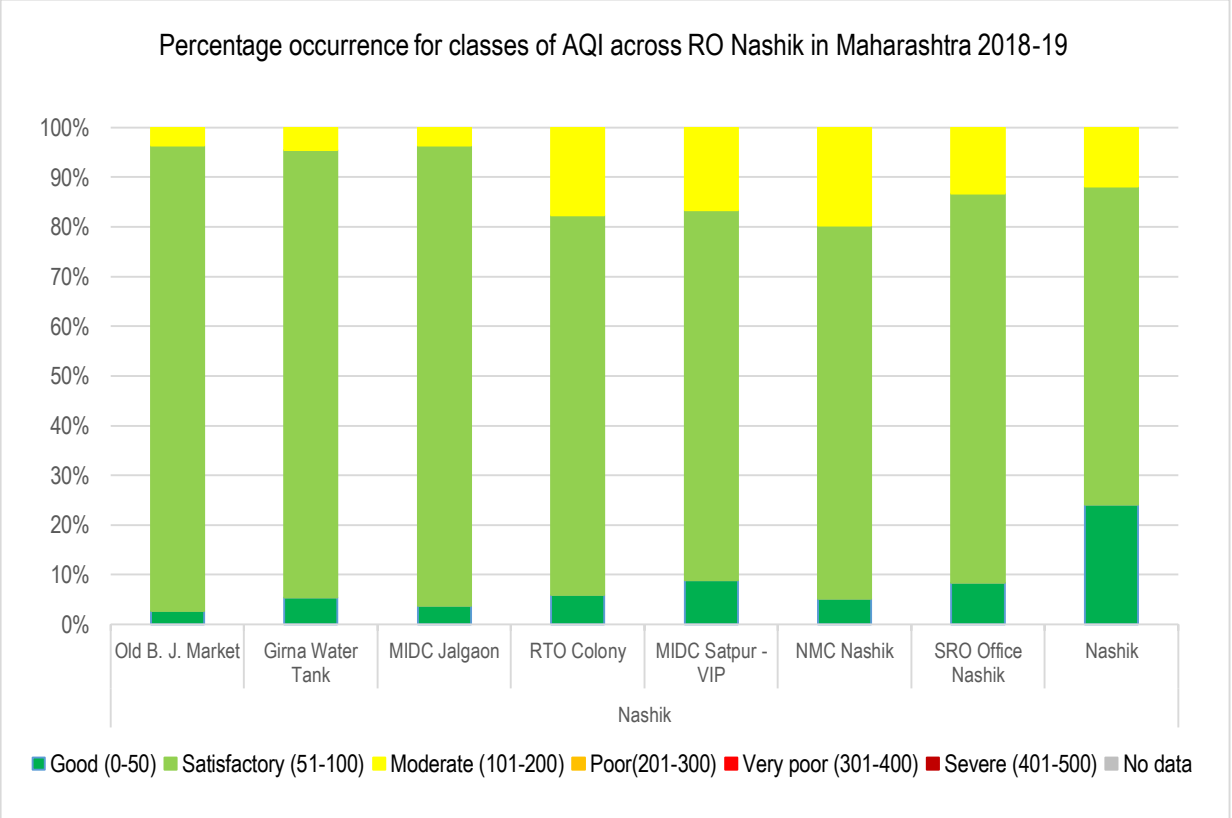


Figure No. 125: Annual average trend of SO_2, NOx, and RSPM at Nashik CAAQMS

Table No. 123: Percentage exceedance of pollutants at Nashik RO

Station Name	Total Observations	Exceedence			% Exceedence		
		SO_2	NOx	RSPM	SO_2	NOx	RSPM
Old B. J. Market	110	0	4	88	0	4	80
Girna Water Tank	111	0	5	76	0	5	68
MIDC Jalgaon	109	0	4	98	0	4	90
RTO Colony	102	0	1	73	0	1	72
MIDC Satpur - VIP	104	0	1	72	0	1	71
NMC Nashik	98	0	0	68	0	0	71
SRO Office Nashik	312	0	2	214	0	1	69
Nashik CAAQMS	353	0	0	230	0	0	65



RO – Navi Mumbai

MPCB RO	Region	Station code	Station name	Type	Latitude (deg)	Longitude (deg)
Navi Mumbai	Navi Mumbai	491	Rabale	Industrial	19° 08' 15.2" N	73° 00' 13.1" E
	Navi Mumbai	492	Nerul - DY Patil	Residential	19° 02' 28.1" N	73° 01' 29.5" E
	Navi Mumbai	493	Mahape, MPCB-Nirmal Bhavan	Industrial	19° 06' 49.0" N	73° 00' 40.1" E
	Navi Mumbai		Airoli	Rural and other areas	19° 09' 21.4" N	72° 59' 35.4" E
	Taloja	494	Kharghar - CIDCO Nodal Office	Residential	19° 02' 29.4" N	73° 04' 11.8" E
	Taloja	496	Taloja - MIDC Building	Industrial	19° 03' 40.0" N	73° 06' 58.6" E

Navi Mumbai - Rabale

Table No. 124: Data for Monthly average reading recorded at Rabale

Station Name	Year	Month	Average of SO_2(µg/m³)	Average of NOx(µg/m³)	Average of RSPM(µg/m³)
Rabale	2018	Apr	25	65	74
		May	22	56	69
		Jun	18	42	73
		Jul	17	38	43
		Aug	16	38	43
		Sep	20	41	44
		Oct	20	42	52
		Nov	16	43	50
		Dec	18	41	53
	2019	Jan	17	50	48
		Feb	17	41	49
		Mar	20	53	50

Note: Monthly graphs do not have any CPCB Standard[72]

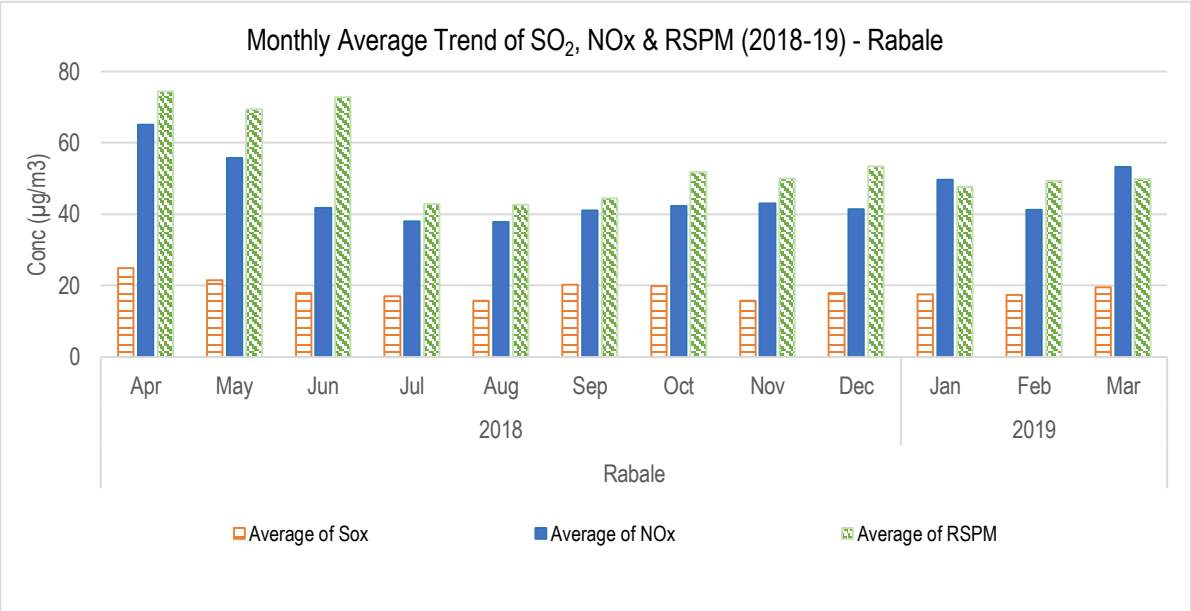


Figure No. 126: Monthly average reading recorded at Rabale

[72] https://cpcb.nic.in/air-quality-standard/

Table No. 125: Data for Annual average trend of SO_2, NOx, and RSPM at Rabale

Station Name	Year	Average of SO_2(µg/m³)	Average of NO_X(µg/m³)	Average of RSPM(µg/m³)
Annual Permissible Limit (CPCB)		*50*	*40*	*60*
Rabale	06-07	25	31	106
	07-08	12	27	79
	08-09	16	31	94
	09-10	13	36	83
	10-11	22	43	125
	11-12	18	47	100
	12-13	18	46	71
	13-14	18	44	90
	14-15	18	40	132
	15-16	21	48	131
	16-17	20	44	107
	17-18	23	46	112
	18-19	19	46	54

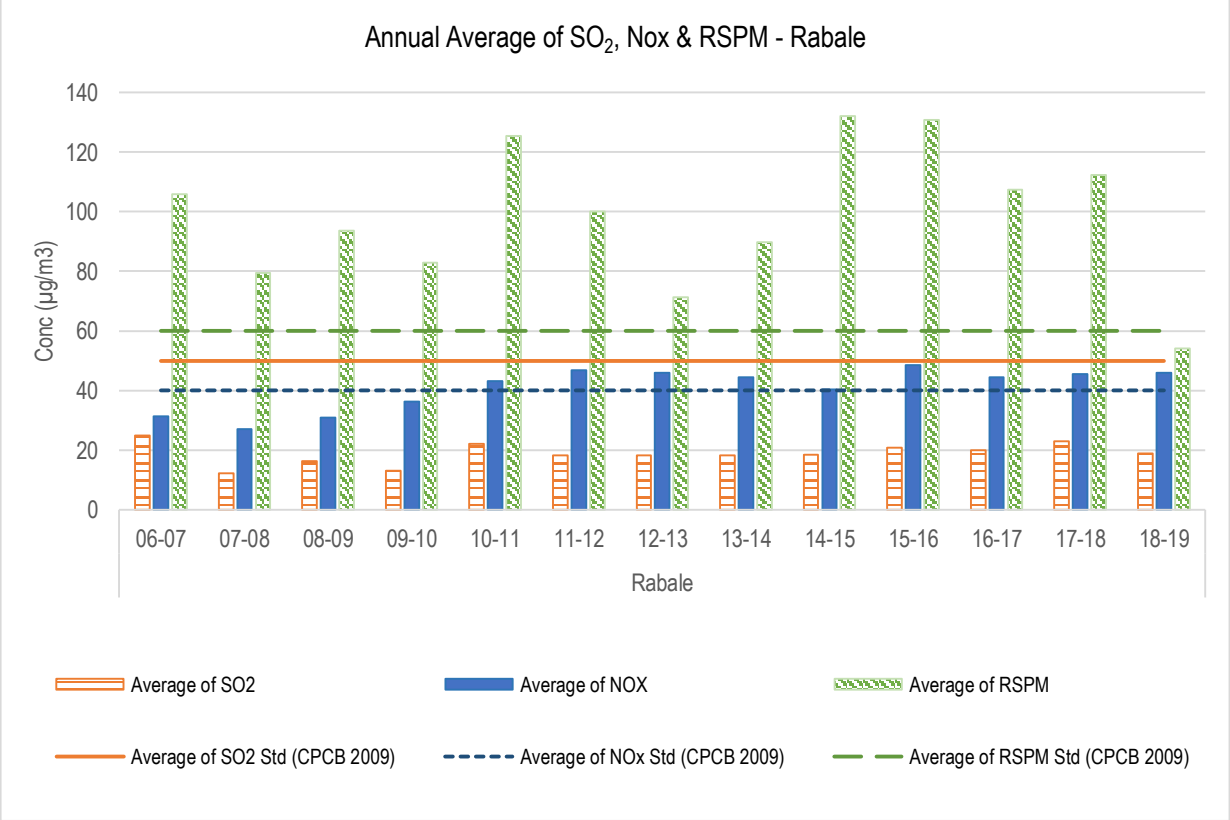


Figure No. 127: Annual average trend of SO_2, NOx, and RSPM at Rabale

Navi Mumbai - Nerul – DY Patil

Table No. 126: Data for Monthly average reading recorded at Nerul – DY Patil

Station Name	Year	Month	Average of SO_2(µg/m³)	Average of NOx(µg/m³)	Average of RSPM(µg/m³)
Nerul - DY Patil	2018	Apr	23	55	82
		May	21	49	86
		Jun	18	46	78
		Jul	15	36	52
		Aug	15	32	44
		Sep	20	35	43
		Oct	21	38	61
		Nov	15	42	49
		Dec	17	42	59
	2019	Jan	16	49	53
		Feb	17	46	54
		Mar	18	54	50

Note: Monthly graphs do not have any CPCB Standard[73]

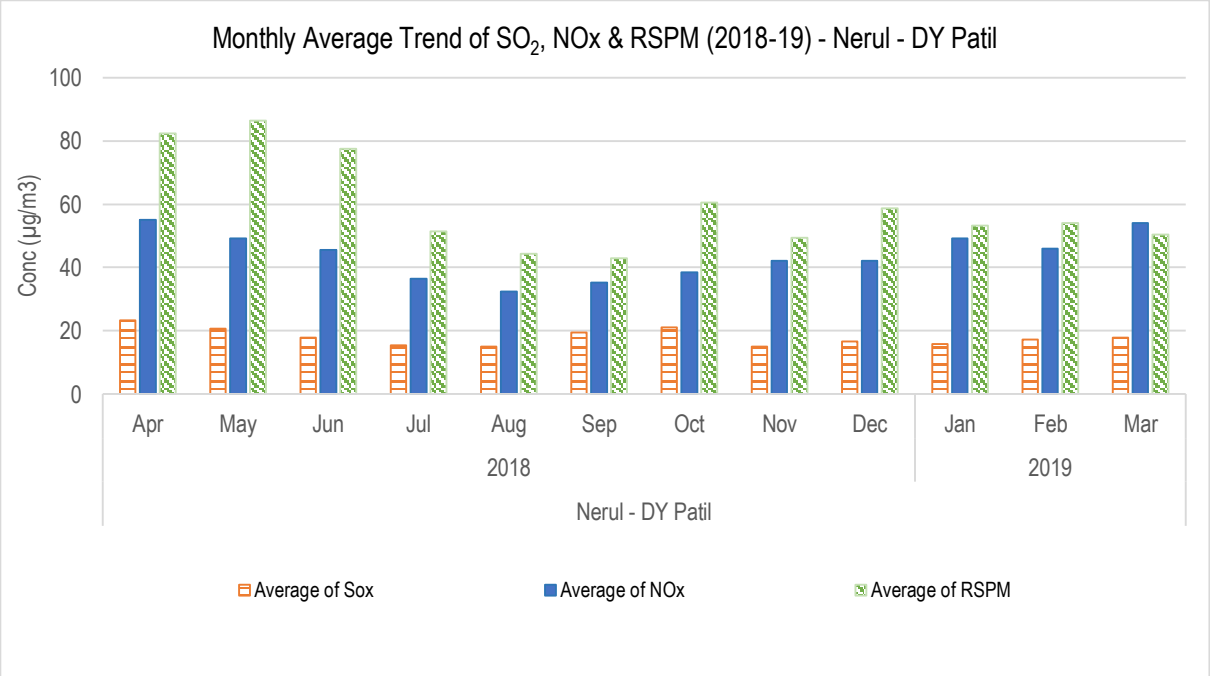


Figure No. 128: Monthly average reading recorded at Nerul – DY Patil

[73] https://cpcb.nic.in/air-quality-standard/

Table No. 127: Data for Annual average trend of SO_2, NOx, and RSPM at Nerul – DY Patil

Station Name	Year	Average of SO_2(µg/m³)	Average of NO_X(µg/m³)	Average of RSPM(µg/m³)
Annual Permissible Limit (CPCB)		*50*	*40*	*60*
Nerul - DY Patil	06-07	25	31	107
	07-08	17	33	90
	08-09	20	40	98
	09-10	10	37	71
	10-11	14	33	119
	11-12	15	43	118
	12-13	15	40	95
	13-14	17	41	109
	14-15	17	38	131
	15-16	17	41	136
	16-17	18	41	96
	17-18	21	43	116
	18-19	18	44	60

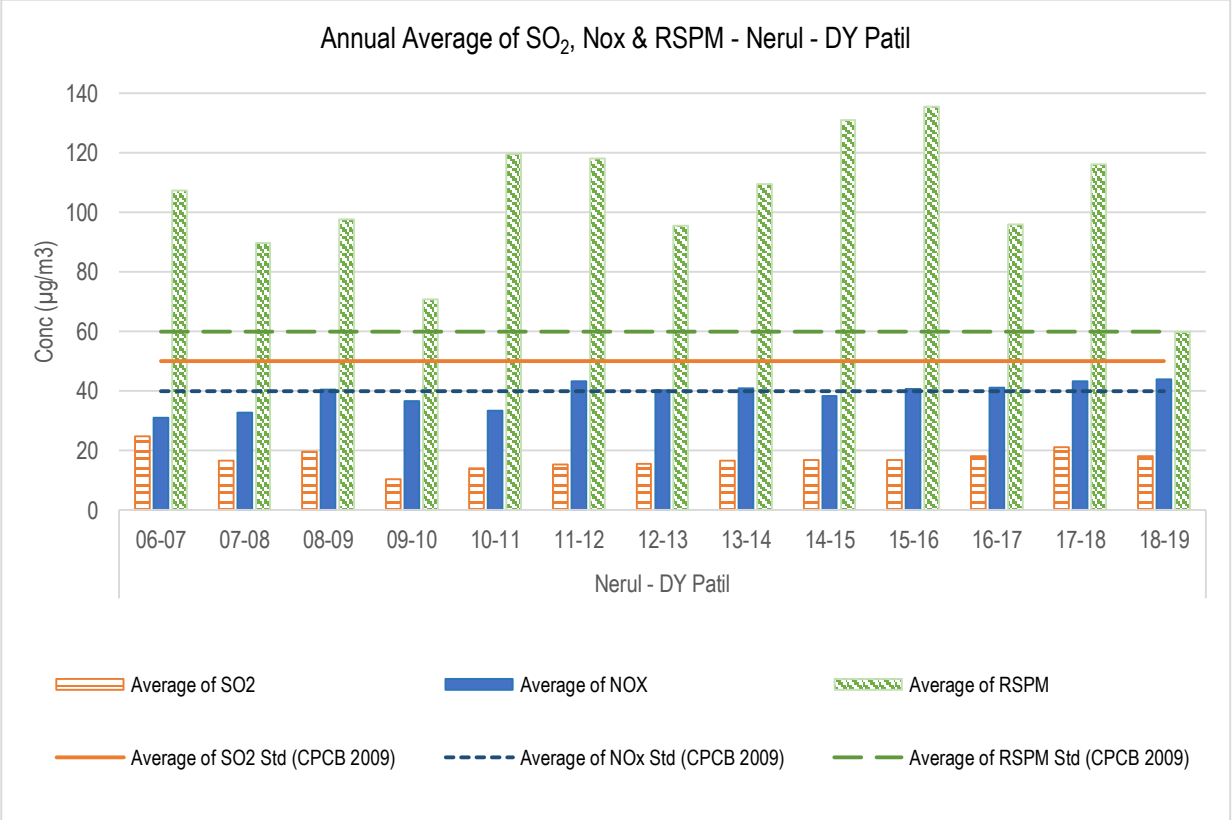


Figure No. 129: Annual average trend of SO_2, NOx, and RSPM at Nerul – DY Patil

Navi Mumbai - Mahape, MPCB Nirmal Bhavan

Table No. 128: Data for Monthly average reading recorded at Mahape, MPCB Nirmal Bhavan

Station Name	Year	Month	Average of SO_2(µg/m³)	Average of NOx(µg/m³)	Average of RSPM(µg/m³)
Mahape, MPCB-Nirmal Bhavan	2018	Apr	23	65	68
		May	23	53	66
		Jun	18	53	84
		Jul	15	39	52
		Aug	17	36	37
		Sep	22	41	44
		Oct	19	40	52
		Nov	16	42	52
		Dec	20	41	45
	2019	Jan	19	49	53
		Feb	18	41	45
		Mar	20	51	49

Note: Monthly graphs do not have any CPCB Standard[74]

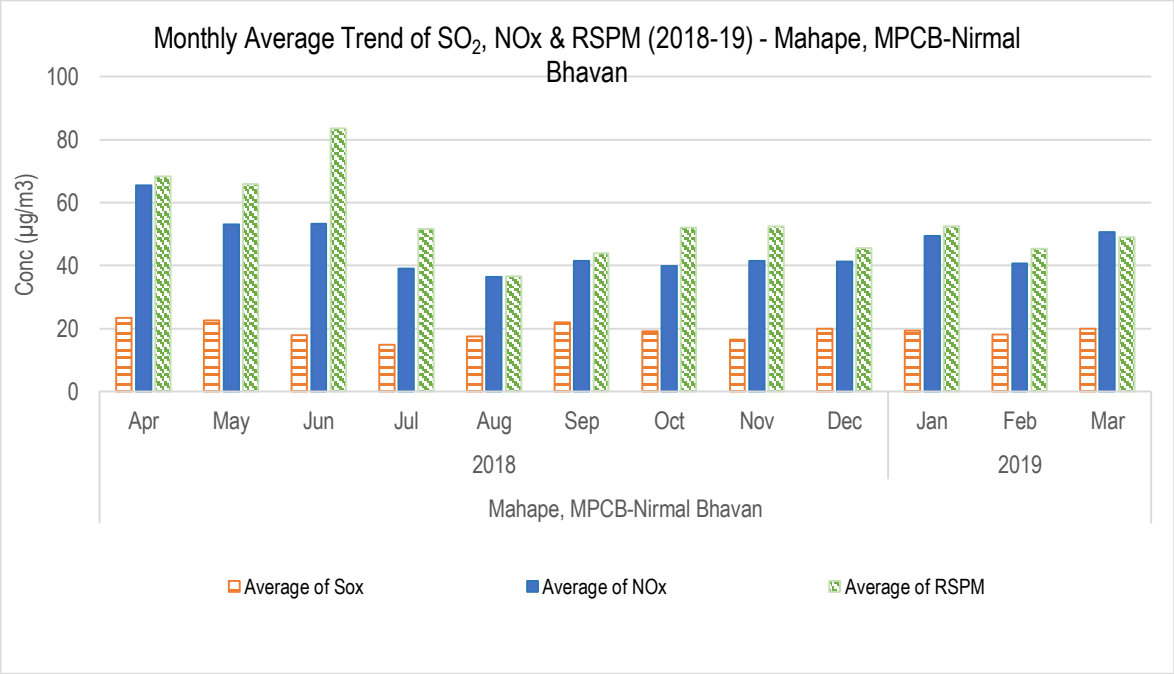


Figure No. 130: Monthly average reading recorded at Mahape, MPCB Nirmal Bhavan

[74] https://cpcb.nic.in/air-quality-standard/

Table No. 129: Data for Annual average trend of SO_2, NOx, and RSPM at Mahape, MPCB Nirmal Bhavan

Station Name	Year	Average of SO_2(µg/m³)	Average of NO_X(µg/m³)	Average of RSPM(µg/m³)
Annual Permissible Limit (CPCB)		*50*	*40*	*60*
Mahape, MPCB-Nirmal Bhavan	06-07	37	27	106
	07-08	17	32	94
	08-09	22	43	131
	09-10	15	42	95
	10-11	22	41	101
	11-12	17	44	133
	12-13	18	45	121
	13-14	18	45	182
	14-15	18	40	131
	15-16	20	43	85
	16-17	21	46	91
	17-18	24	45	87
	18-19	19	46	53

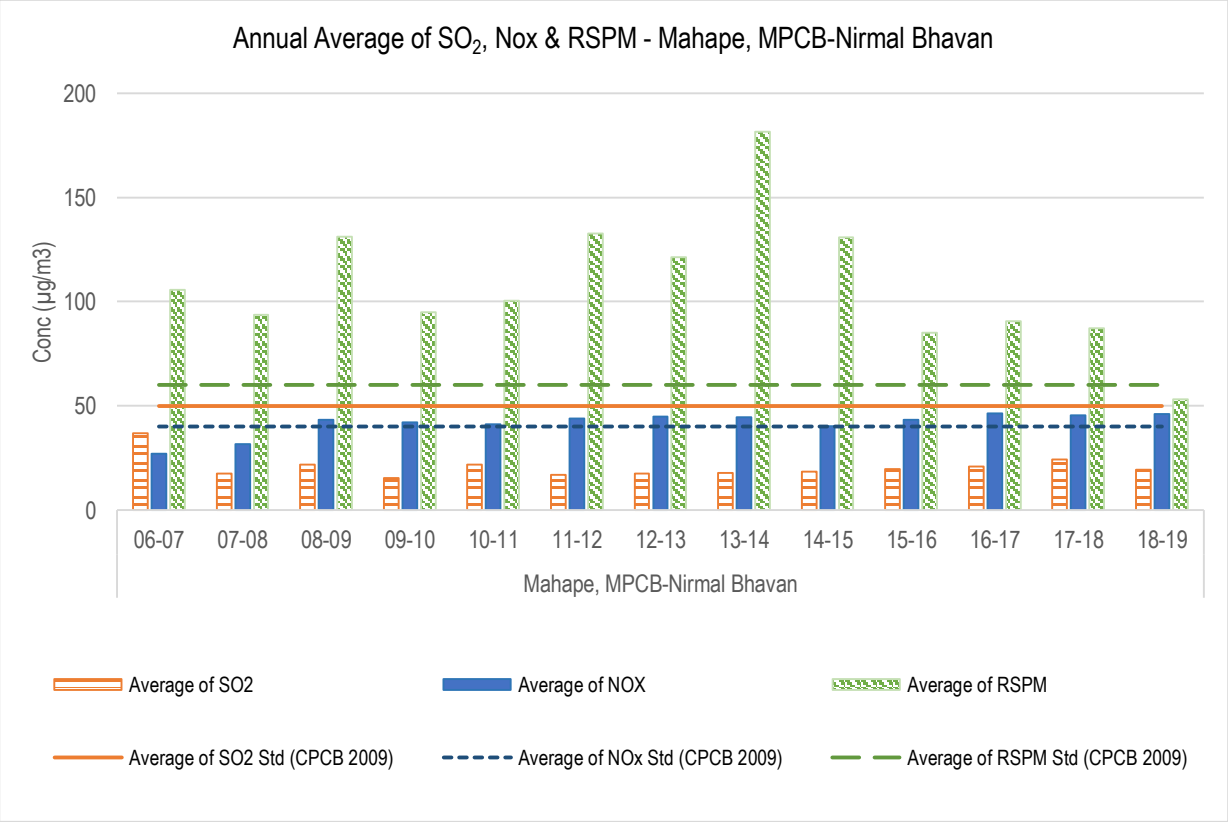


Figure No. 131: Annual average trend of SO_2, NOx, and RSPM at Mahape, MPCB Nirmal Bhavan

Navi Mumbai - Airoli

Table No. 130: Data for Monthly average reading recorded at Airoli

Station Name	Year	Month	Average of SO_2(µg/m³)	Average of NOx(µg/m³)	Average of RSPM(µg/m³)
Airoli	2018	Apr	26	26	83
		May	37	23	72
		Jun	25	28	76
		Jul	20	33	40
		Aug	21	28	32
		Sep	21	22	61
		Oct	25	23	76
		Nov	36	32	111
		Dec	38	40	133
	2019	Jan	37	42	146
		Feb	40	45	135
		Mar	47	53	119

Note: Monthly graphs do not have any CPCB Standard[75]

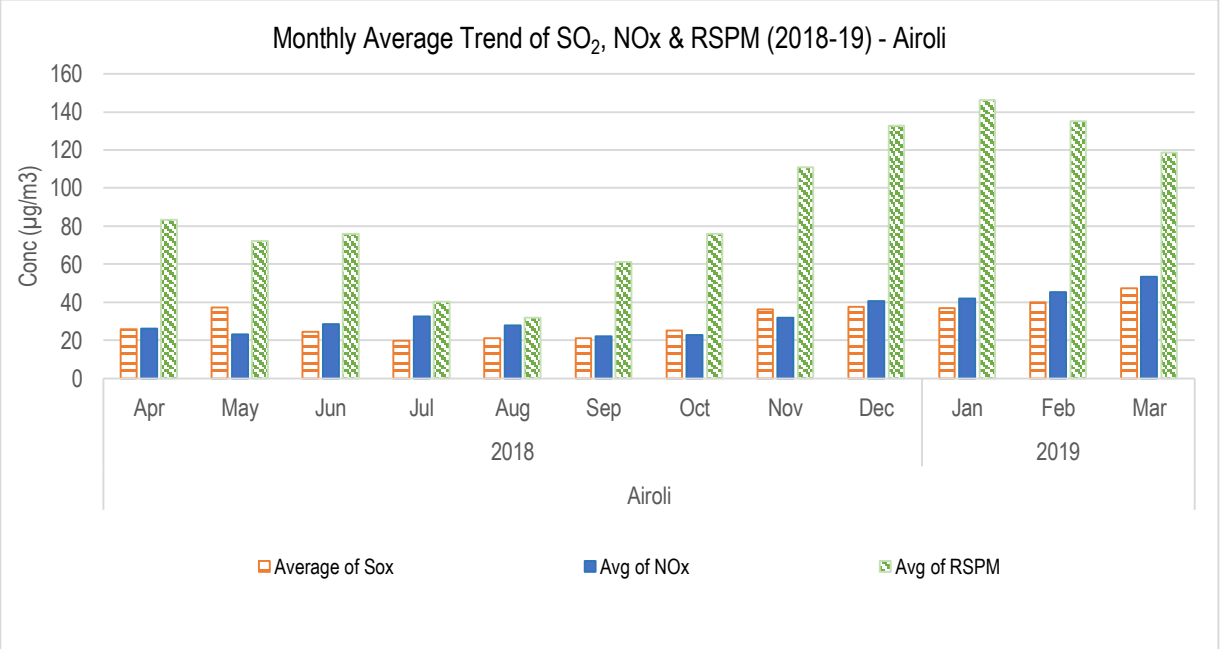


Figure No. 132: Monthly average reading recorded at Airoli

[75] https://cpcb.nic.in/air-quality-standard/

Table No. 131: Data for Annual average trend of SO_2, NOx, and RSPM at Airoli

Station Name	Year	Average of SO_2(µg/m³)	Average of NOX(µg/m³)	Average of RSPM(µg/m³)
Annual Permissible Limit (CPCB)		*50*	*40*	*60*
Airoli	08-09	31	112	87
	09-10	23	89	120
	10-11	27	67	128
	11-12	13	75	181
	12-13	21	43	109
	13-14	22	53	53
	14-15	17	28	38
	15-16	26	39	36
	16-17	26	39	35
	17-18	30	37	69
	18-19	31	33	89

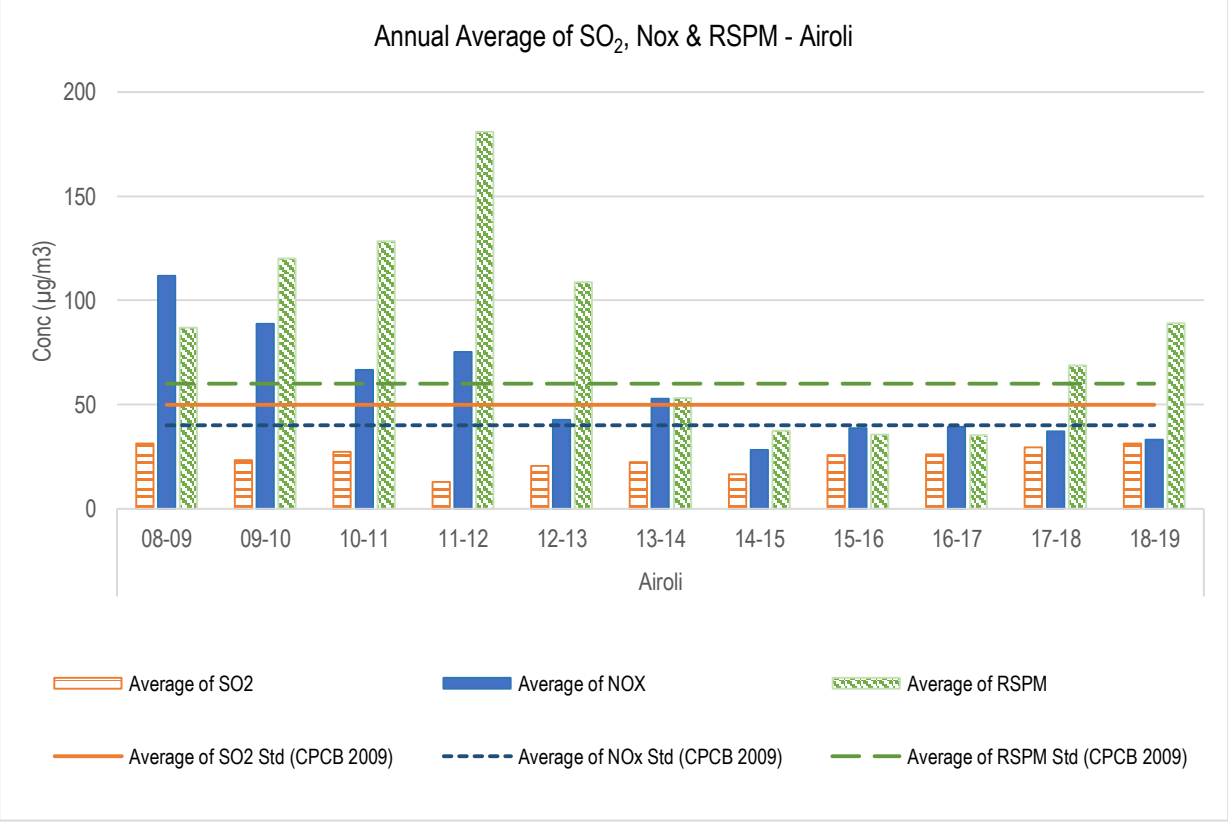


Figure No. 133: Annual average trend of SO_2, NOx, and RSPM at Airoli

Taloja - Kharghar-CIDCO Nodel Office

Table No. 132: Data for Monthly average reading recorded at Kharghar-CIDCO Nodel Office

Station Name	Year	Month	Average of SO_2(µg/m³)	Average of NOx(µg/m³)	Average of RSPM(µg/m³)
Kharghar - CIDCO Nodal Office	2018	Apr	23	62	83
		May	19	52	84
		Jun	19	39	66
		Jul	15	41	49
		Aug	17	39	40
		Sep	19	41	46
		Oct	20	40	59
		Nov	17	42	59
		Dec	15	41	59
	2019	Jan	17	50	53
		Feb	16	47	50
		Mar	20	52	53

Note: Monthly graphs do not have any CPCB Standard[76]

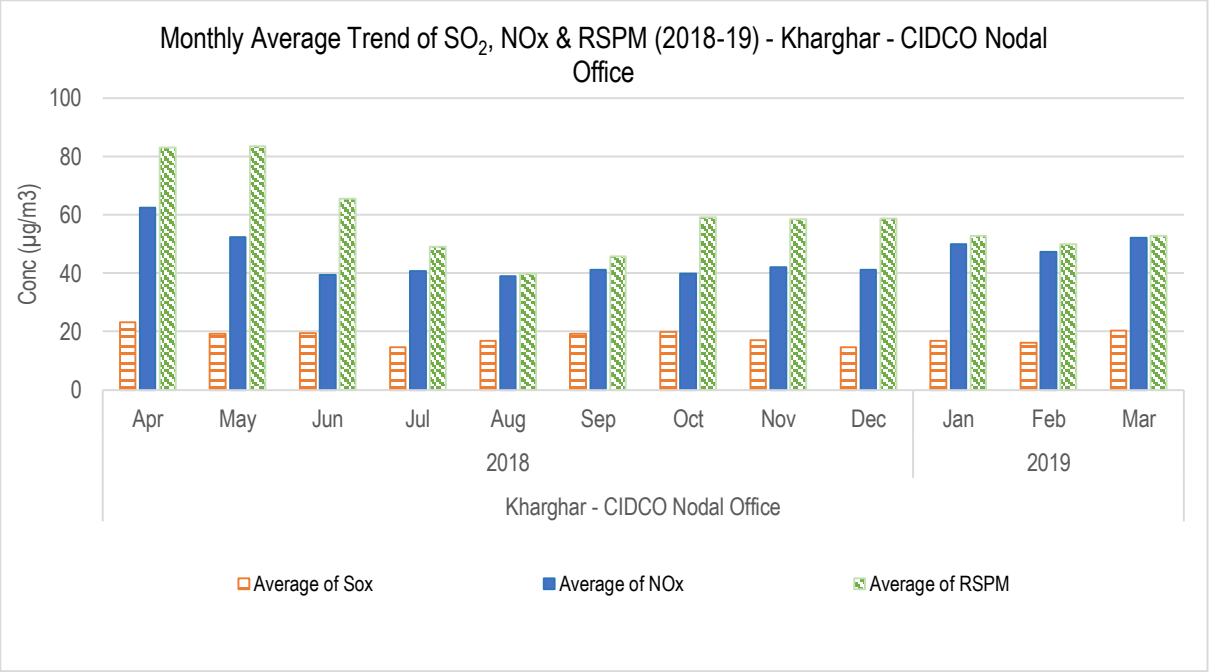


Figure No. 134: Monthly average reading recorded at Kharghar-CIDCO Nodel Office

[76] https://cpcb.nic.in/air-quality-standard/

Table No. 133: Data for Annual average trend of SO_2, NOx, and RSPM at Kharghar-CIDCO Nodel Office

Station Name	Year	Average of SO_2(µg/m³)	Average of NOX(µg/m³)	Average of RSPM(µg/m³)
Annual Permissible Limit (CPCB)		*50*	*40*	*60*
Kharghar - CIDCO Nodal Office	06-07	18	33	96
	07-08	10	31	108
	08-09	13	40	115
	09-10	10	35	75
	10-11	17	37	122
	11-12	16	43	122
	12-13	16	41	122
	13-14	17	42	125
	14-15	17	38	127
	15-16	17	41	116
	16-17	18	45	90
	17-18	22	44	91
	18-19	18	45	57

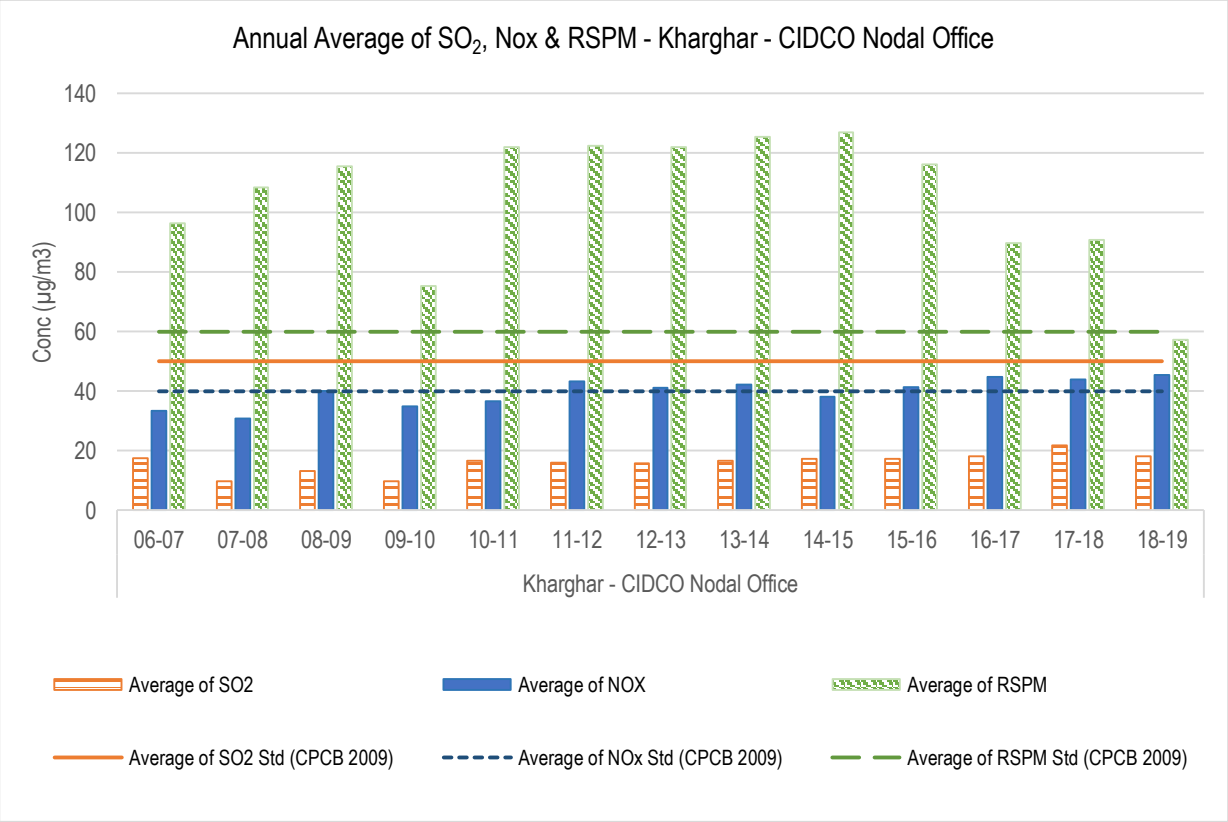


Figure No. 135: Annual average trend of SO_2, NOx, and RSPM at Kharghar-CIDCO Nodel Office

Taloja - MIDC Building

Table No. 134: Data for Monthly average reading recorded at Taloja - MIDC Building

Station Name	Year	Month	Average of SO_2(µg/m³)	Average of NOx(µg/m³)	Average of RSPM(µg/m³)
Taloja - MIDC Building	2018	Apr	26	62	88
		May	23	52	84
		Jun	18	53	71
		Jul	15	43	46
		Aug	16	35	42
		Sep	21	41	46
		Oct	20	41	50
		Nov	17	41	56
		Dec	16	39	57
	2019	Jan	17	51	51
		Feb	16	48	48
		Mar	21	46	54

Note: Monthly graphs do not have any CPCB Standard[77]

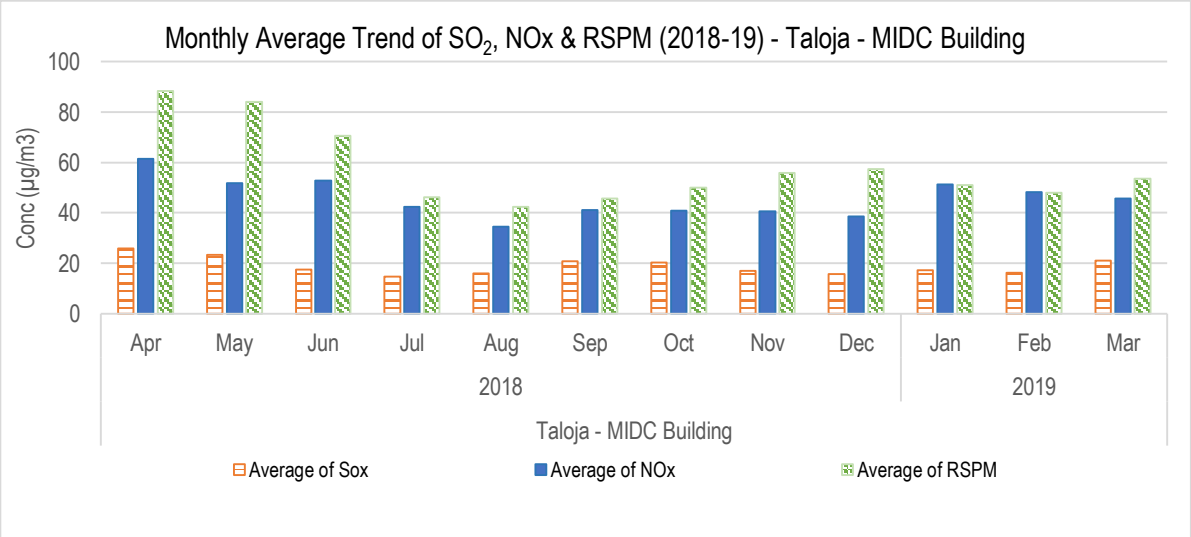


Figure No. 136: Monthly average reading recorded at Taloja -MIDC Building

[77] https://cpcb.nic.in/air-quality-standard/

Table No. 135: Data for Annual average trend of SO_2, NOx, and RSPM at Taloja -MIDC Building

Station Name	Year	Average of SO_2(µg/m³)	Average of NO_X(µg/m³)	Average of RSPM(µg/m³)
Annual Permissible Limit (CPCB)		*50*	*40*	*60*
Taloja - MIDC Building	06-07	32	40	101
	07-08	22	39	113
	08-09	29	46	241
	09-10	23	55	200
	10-11	27	48	194
	11-12	20	51	148
	12-13	18	45	129
	13-14	19	47	187
	14-15	18	41	142
	15-16	21	47	148
	16-17	21	47	111
	17-18	23	47	105
	18-19	19	46	58

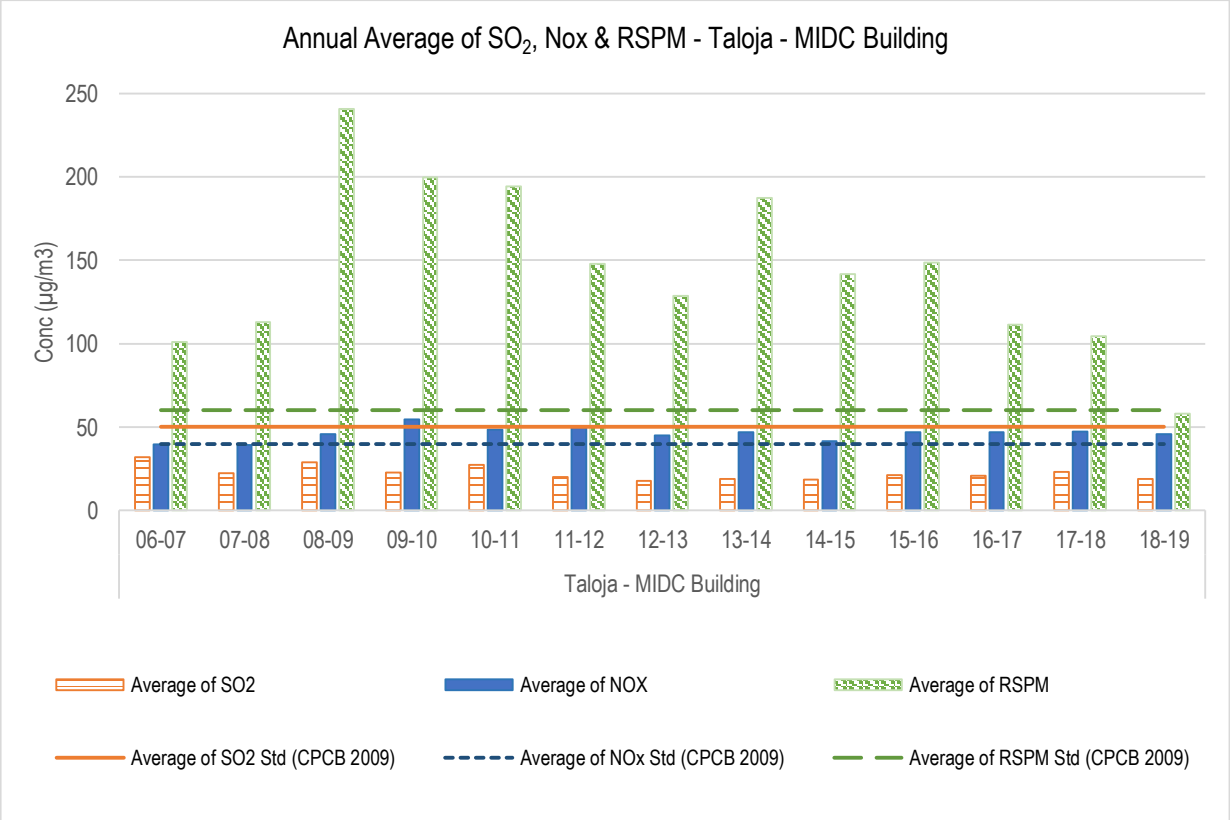
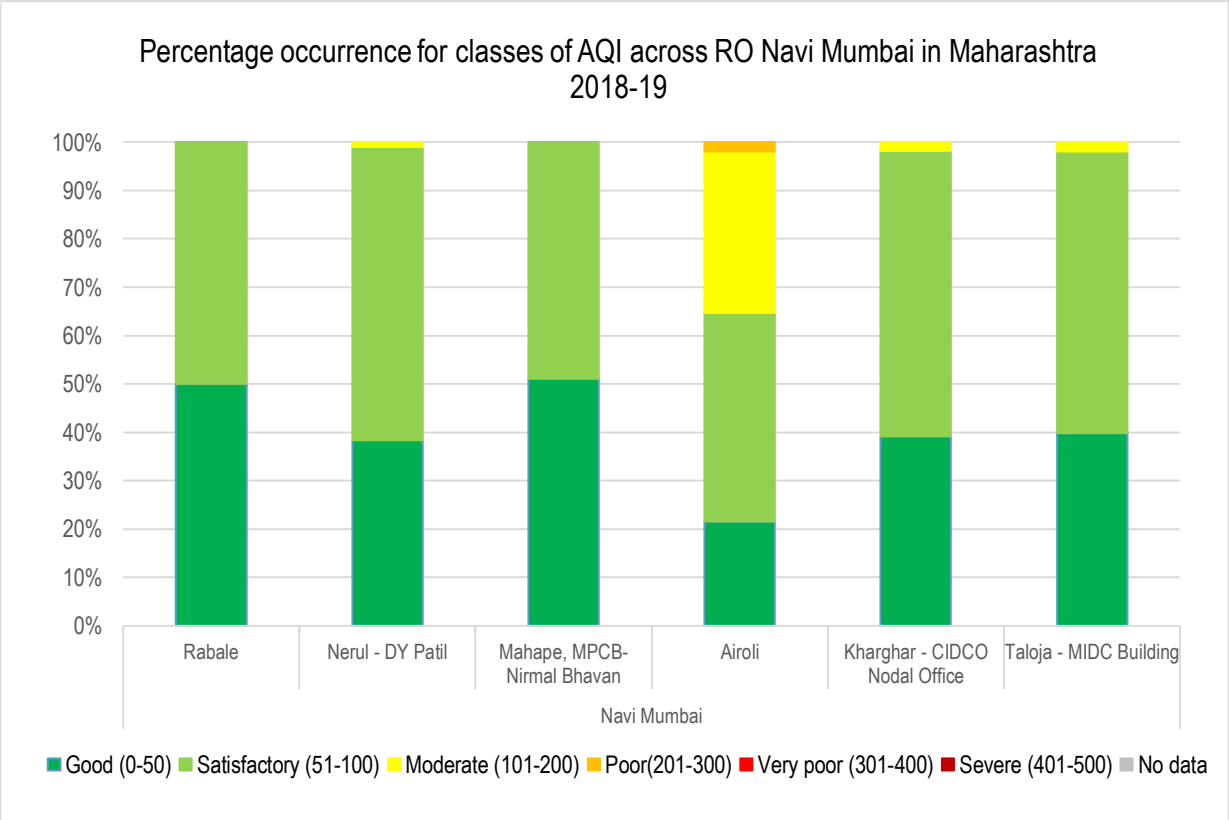


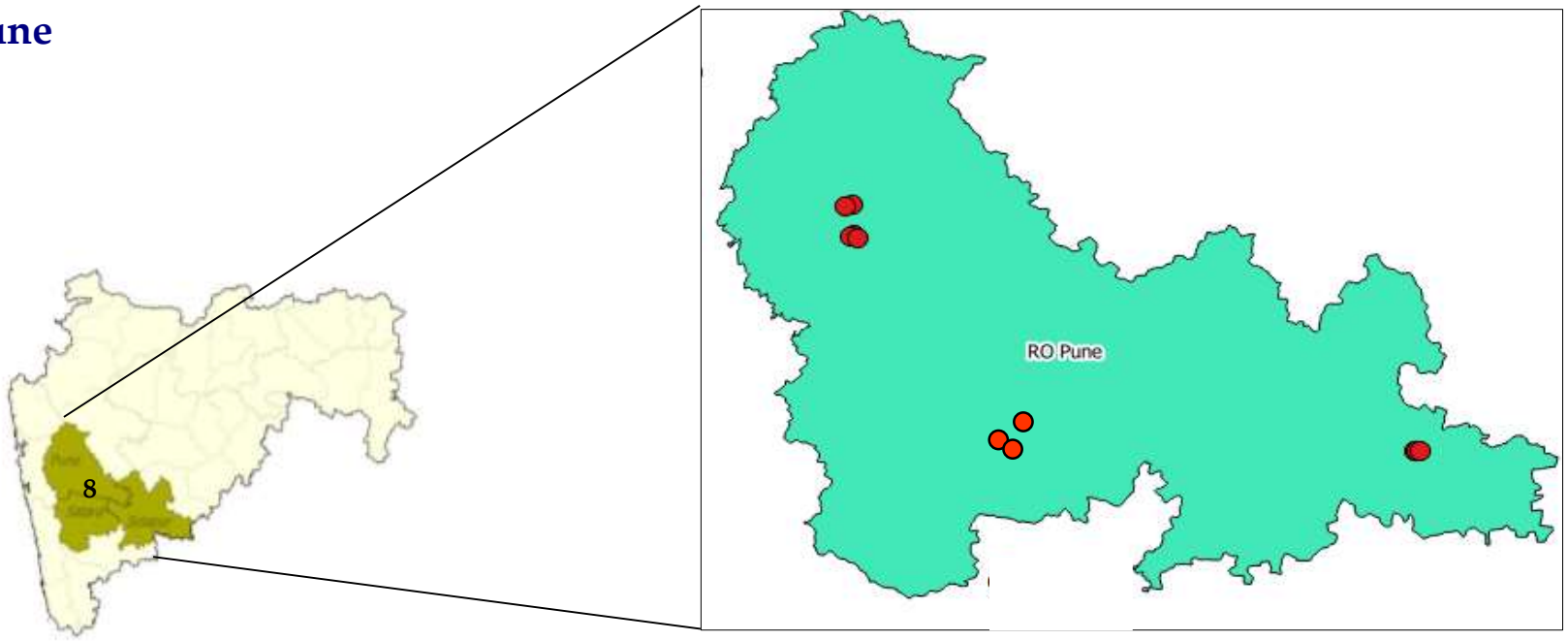
Figure No. 137: Annual average trend of SO_2, NOx, and RSPM at Taloja -MIDC Building

Table No. 136: Percentage exceedance of pollutants at Navi Mumbai RO

Station Name	Total Observations	Exceedence			% Exceedence		
		SO_2	NOx	RSPM	SO_2	NOx	RSPM
Rabale	98	0	72	24	0	74	24
Nerul - DY Patil	99	0	62	46	0	63	46
Mahape, MPCB-Nirmal Bhavan	96	0	73	26	0	76	27
Airoli	331	10	110	229	3	33	73
Kharghar - CIDCO Nodal Office	110	0	78	33	0	71	30
Taloja - MIDC Building	103	0	78	40	0	76	39



RO – Pune



MPCB RO	Region	Station code	Station name	Type	Latitude (deg)	Longitude (deg)
Pune	Pune	312	Bhosari	Industrial	18° 38' 04.1" N	73° 49' 42.0" E
	Pune	379	Nal Stop	Rural and other areas	18° 30' 25.2" N	73° 49' 39.2" E
	Pune	381	Swargate, Pune	Residential	18° 30' 12.6" N	73° 51' 09.4" E
	Pune	708	Pimpri-Chinchwad - BOB Building	Residential	18° 37' 41.0" N	73° 48' 17.0" E
	Pune		Karve Road - CAAQMS	Residential	18° 30' 45.1" N	73° 50' 22.6" E
	Solapur	299	WIT Campus	Residential	17° 40' 06.6" N	75° 55' 19.3" E
	Solapur	300	Saat Rasta- Chithale Clinic	Residential	17° 39' 57.6" N	75° 54' 23.4" E
	Solapur		Solapur	Residential	17° 40' 07.1" N	75° 54' 05.2" E

Pune - Bhosari

Table No. 137: Data for Monthly average reading recorded at Bhosari

Station Name	Year	Month	Average of SO_2 (µg/m³)	Average of NOx (µg/m³)	Average of RSPM (µg/m³)
Bhosari	2018	Apr	24	51	109
		May	28	46	108
		Jun	34	45	62
		Jul	28	56	65
		Aug	26	47	26
		Sep	26	48	37
		Oct	37	57	122
		Nov	30	65	124
		Dec	32	62	160
	2019	Jan	29	65	87
		Feb	33	74	139
		Mar	35	66	125

Note: Monthly graphs do not have any CPCB Standard[78]

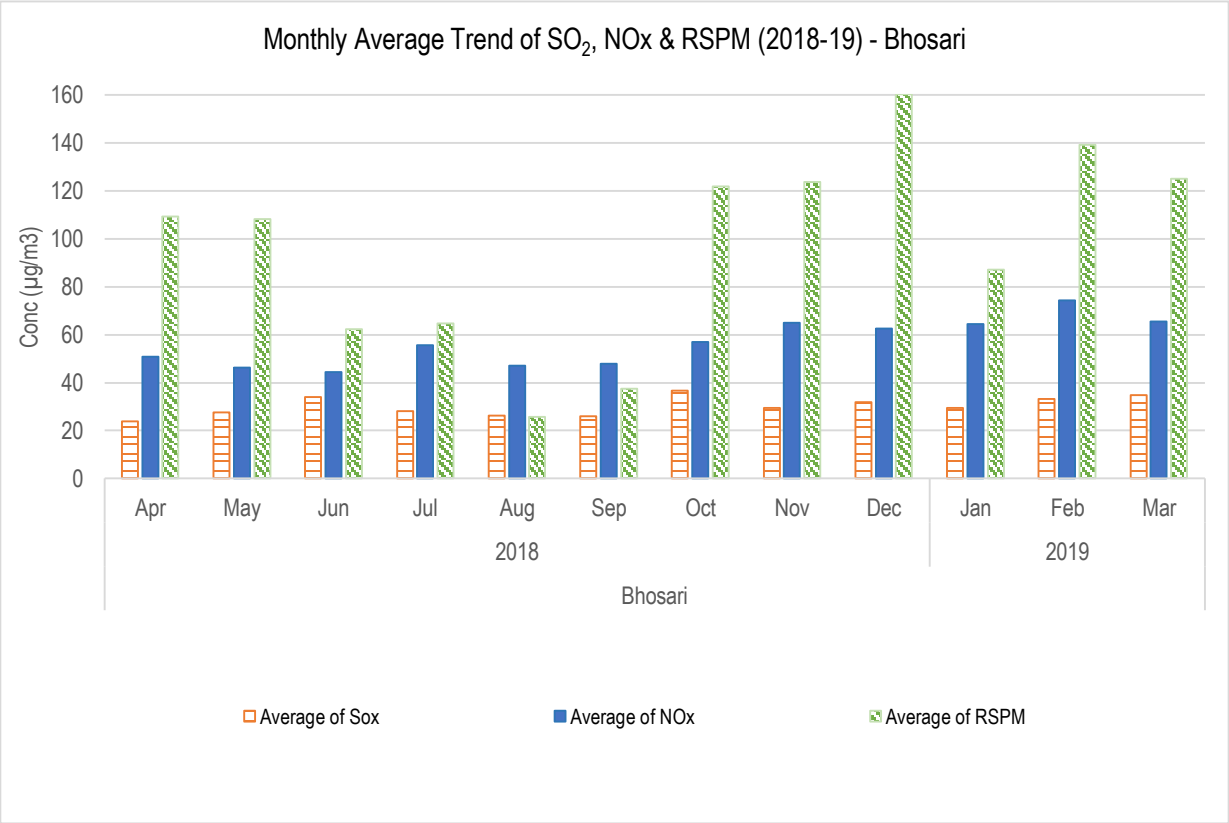


Figure No. 138: Monthly average reading recorded at Bhosari

[78] https://cpcb.nic.in/air-quality-standard/

Table No. 138: Data for Annual average trend of SO_2, NOx, and RSPM at Bhosari

Station Name	Year	Average of SO_2 (µg/m³)	Average of NO_X (µg/m³)	Average of RSPM (µg/m³)
Annual Permissible Limit (CPCB)		*50*	*40*	*60*
Bhosari	05-06	27	42	144
	06-07	24	42	126
	07-08	20	42	111
	08-09	24	37	109
	09-10	42	36	88
	10-11	30	38	84
	11-12	37	49	130
	12-13	25	39	101
	13-14	23	35	93
	14-15	26	47	101
	15-16	31	50	97
	16-17	28	67	115
	17-18	24	58	112
	18-19	29	53	87

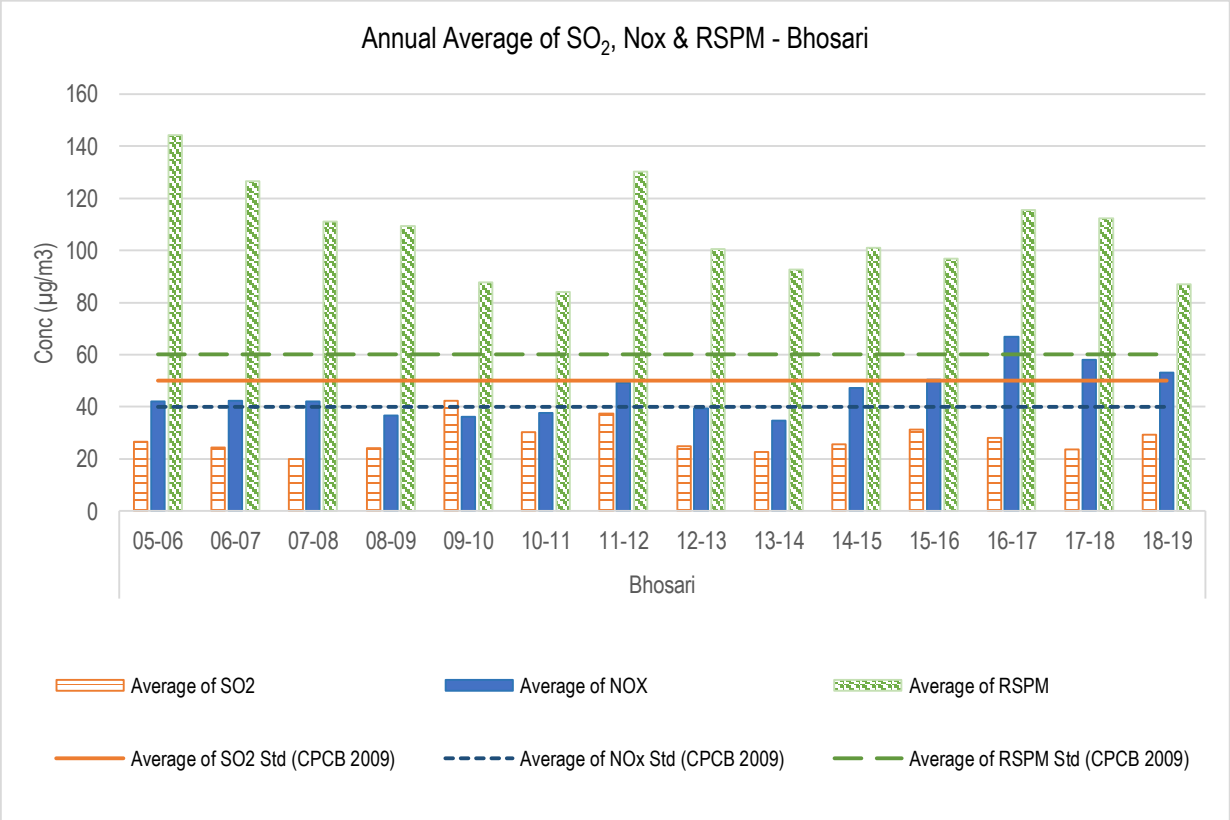


Figure No. 139: Annual average trend of SO_2, NOx, and RSPM at Bhosari

Pune - Nal Stop

Table No. 139: Data for Monthly average reading recorded at Nal Stop

Station Name	Year	Month	Average of SO_2 (µg/m³)	Average of NOx (µg/m³)	Average of RSPM (µg/m³)
Nal Stop	2018	Apr	18	56	139
		May	29	58	106
		Jun	28	57	66
		Jul	23	58	49
		Aug	35	64	52
		Sep	37	58	82
		Oct	38	87	106
		Nov	28	55	111
		Dec	33	72	126
	2019	Jan	24	86	163
		Feb	28	62	138
		Mar	33	57	148

Note: Monthly graphs do not have any CPCB Standard[79]

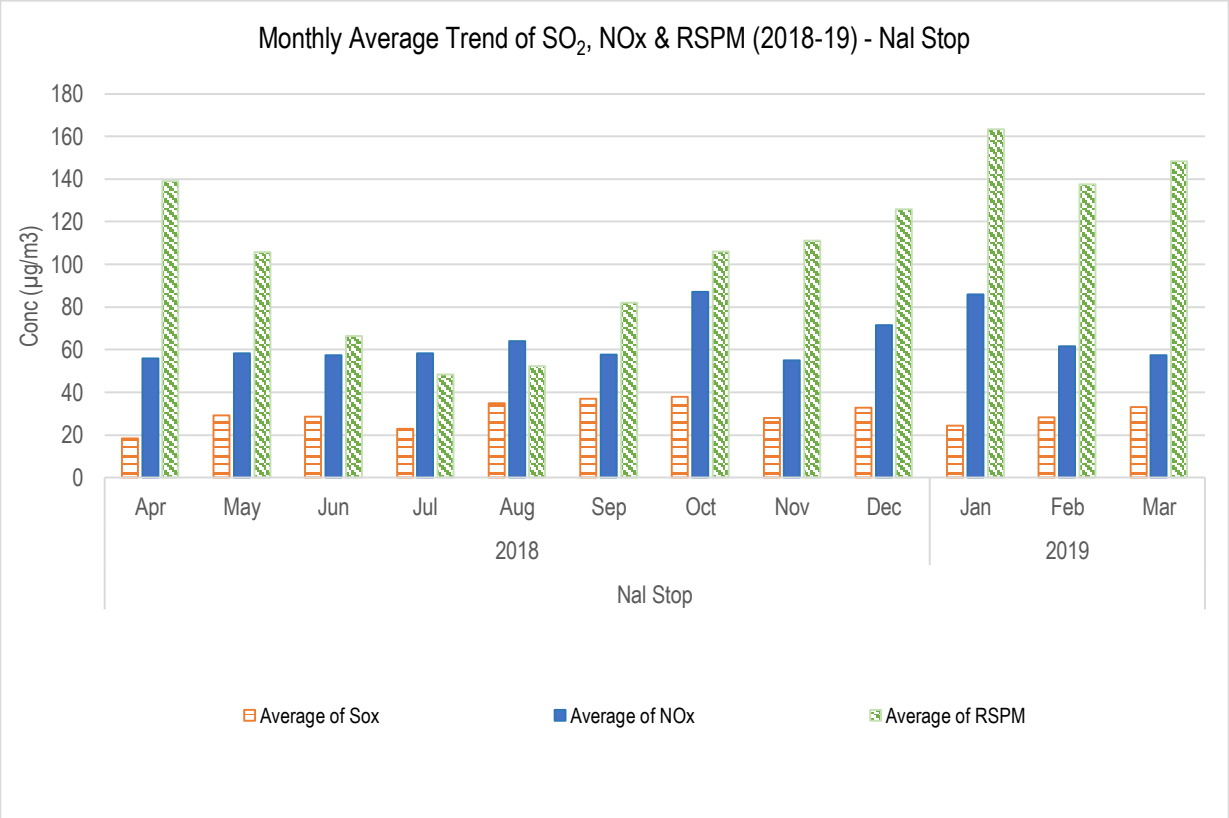


Figure No. 140: Monthly average reading recorded at Nal Stop

[79] https://cpcb.nic.in/air-quality-standard/

Table No. 140: Data for Annual average trend of SO_2, NOx, and RSPM at Nal Stop

Station Name	Year	Average of SO_2 (µg/m³)	Average of NO_X (µg/m³)	Average of RSPM (µg/m³)
Annual Permissible Limit (CPCB)		*50*	*40*	*60*
Nal Stop	05-06	27	43	152
	06-07	23	42	129
	07-08	19	42	108
	08-09	21	41	91
	09-10	23	39	82
	10-11	21	43	88
	11-12	30	62	100
	12-13	19	45	82
	13-14	20	39	82
	14-15	22	48	92
	15-16	21	64	88
	16-17	23	78	107
	17-18	21	63	101
	18-19	28	59	105

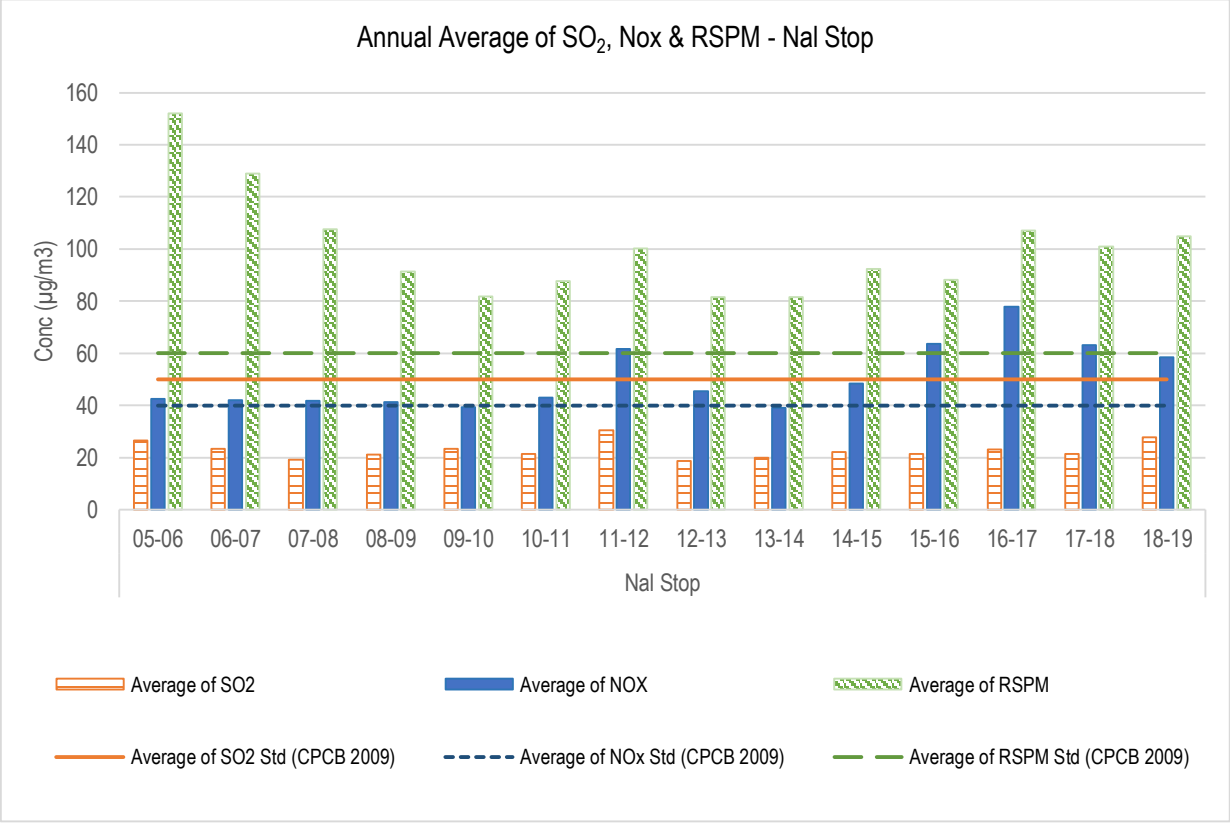


Figure No. 141: Annual average trend of SO_2, NOx, and RSPM at Nal Stop

Pune - Swargate, Pune

Table No. 141: Data for Monthly average reading recorded at Swargate, Pune

Station Name	Year	Month	Average of SO_2 (µg/m³)	Average of NOx (µg/m³)	Average of RSPM (µg/m³)
Swargate, Pune	2018	Apr	20	57	85
		May	32	48	62
		Jun	31	55	45
		Jul	26	49	21
		Aug	53	72	15
		Sep	52	57	40
		Oct	32	66	82
		Nov	51	46	121
		Dec	33	71	133
	2019	Jan	34	89	156
		Feb	29	92	127

Note: Monthly graphs do not have any CPCB Standard[80]

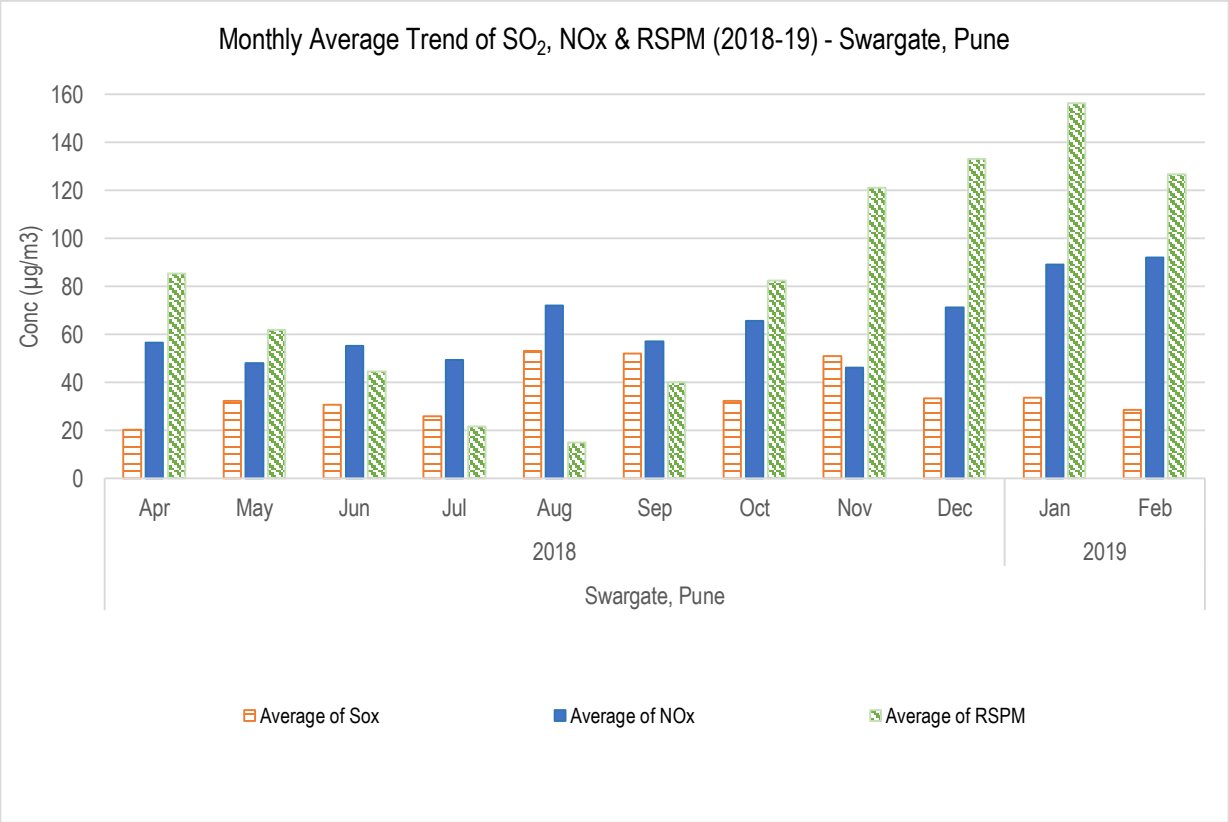


Figure No. 142: Monthly average reading recorded at Swargate, Pune
Note: Data for the month of March is not available

[80] https://cpcb.nic.in/air-quality-standard/

Table No. 142: Data for Annual average trend of SO_2, NOx, and RSPM at Swargate, Pune

Station Name	Year	Average of SO_2 (µg/m³)	Average of NO_X (µg/m³)	Average of RSPM (µg/m³)
Annual Permissible Limit (CPCB)		*50*	*40*	*60*
Swargate, Pune	05-06	27	43	152
	06-07	25	43	138
	07-08	20	46	101
	08-09	23	44	100
	09-10	24	39	81
	10-11	23	50	80
	11-12	28	63	95
	12-13	19	53	75
	13-14	21	42	75
	14-15	22	50	87
	15-16	21	66	106
	16-17	22	84	95
	17-18	22	73	86
	18-19	29	54	76

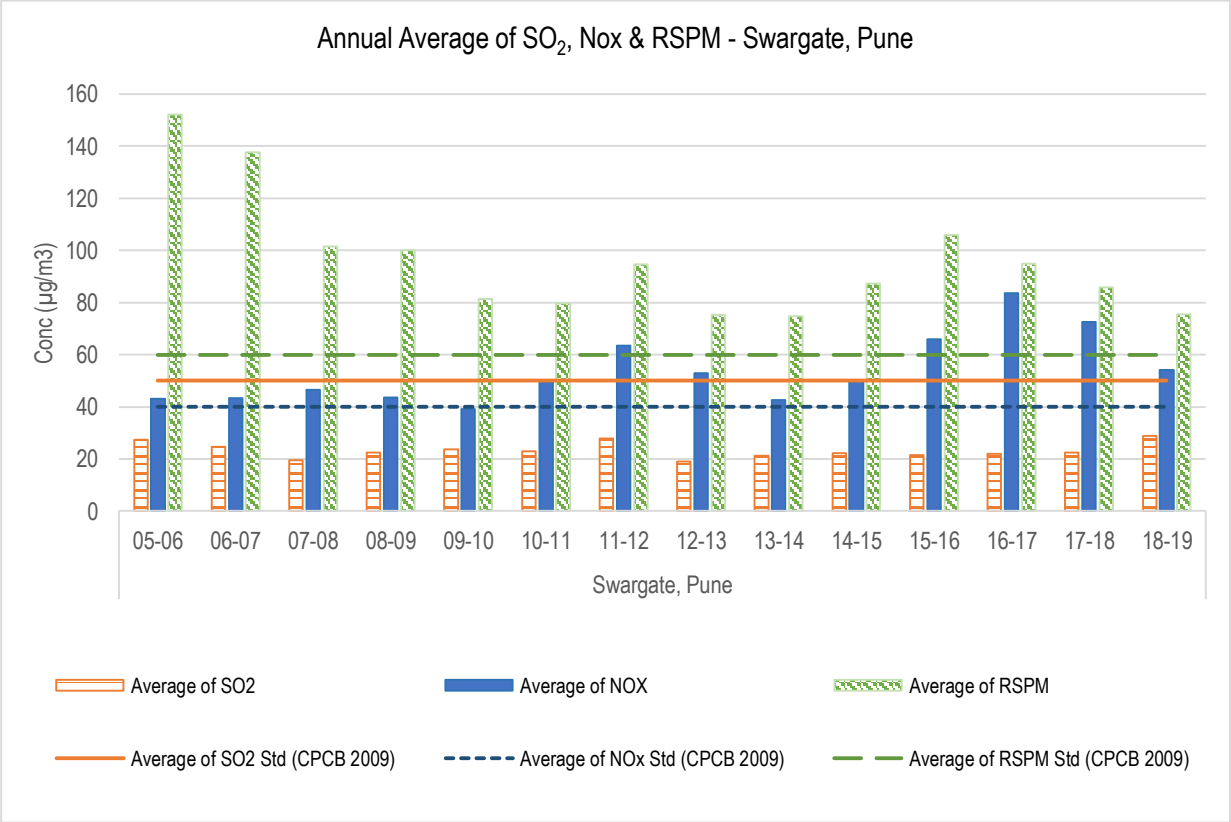


Figure No. 143: Annual average trend of SO_2, NOx, and RSPM at Swargate, Pune

Pune - Pimpri - Chinchwad-BOB Building

Table No. 143: Data for Monthly average reading recorded at Pimpri - Chinchwad-BOB Building

Station Name	Year	Month	Average of SO_2 (µg/m³)	Average of NOx (µg/m³)	Average of RSPM (µg/m³)
Pimpri-Chinchwad - BOB Building	2018	Apr	21	61	90
		May	31	50	69
		Jun	31	45	47
		Jul	27	39	28
		Aug	23	46	26
		Sep	29	51	43
		Oct	26	60	73
		Nov	35	55	102
		Dec	36	66	114
	2019	Jan	34	89	156
		Feb	28	66	98
		Mar	31	64	95

Note: Monthly graphs do not have any CPCB Standard[81]

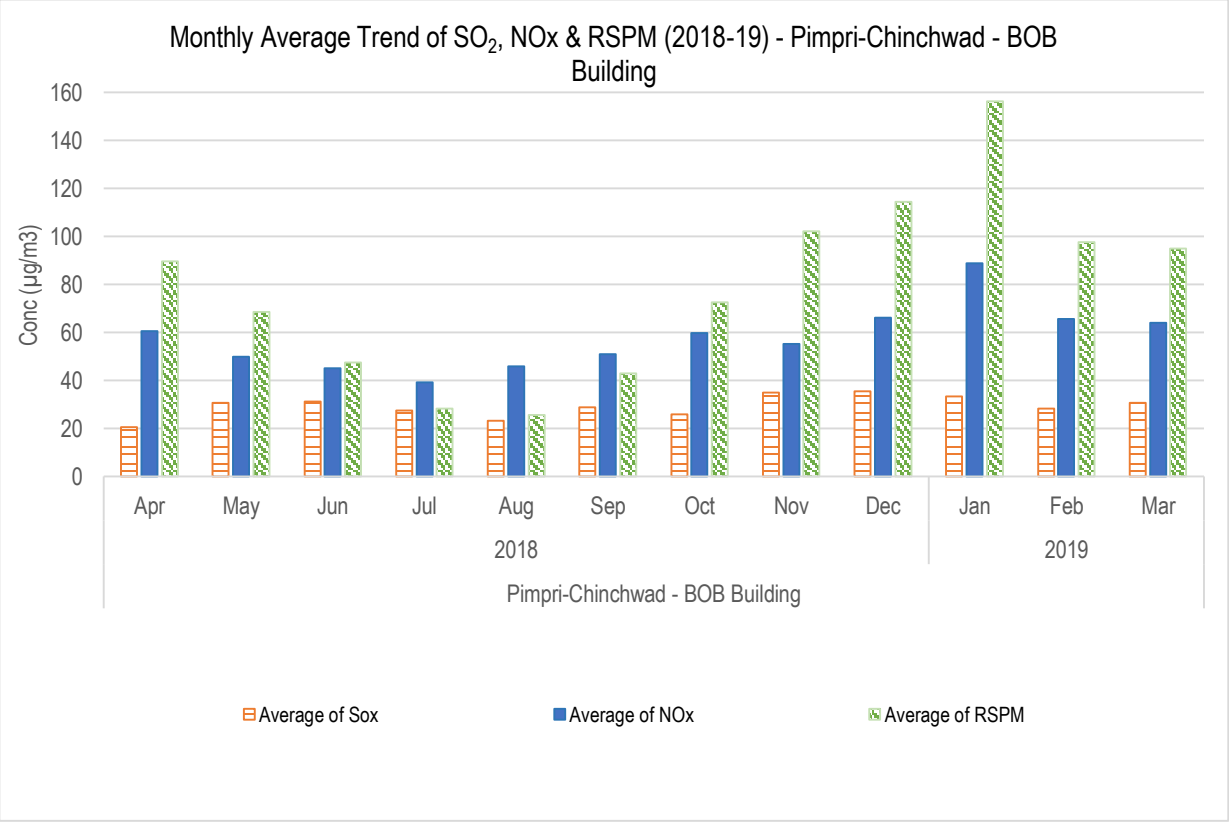


Figure No. 144: Monthly average reading recorded at Pimpri - Chinchwad-BOB Building

[81] https://cpcb.nic.in/air-quality-standard/

Table No. 144: Data for Annual average trend of SO_2, NOx, and RSPM at Pimpri - Chinchwad-BOB Building

Station Name	Year	Average of SO_2 (µg/m³)	Average of NO_X (µg/m³)	Average of RSPM (µg/m³)
Annual Permissible Limit (CPCB)		***50***	***40***	***60***
Pimpri-Chinchwad - BOB Building	05-06	21	35	114
	06-07	24	42	127
	07-08	19	41	105
	08-09	23	39	96
	09-10	31	43	89
	10-11	26	49	86
	11-12	33	57	117
	12-13	20	49	84
	13-14	22	39	82
	14-15	22	44	94
	15-16	27	52	101
	16-17	27	72	87
	17-18	24	57	87
	18-19	28	52	72

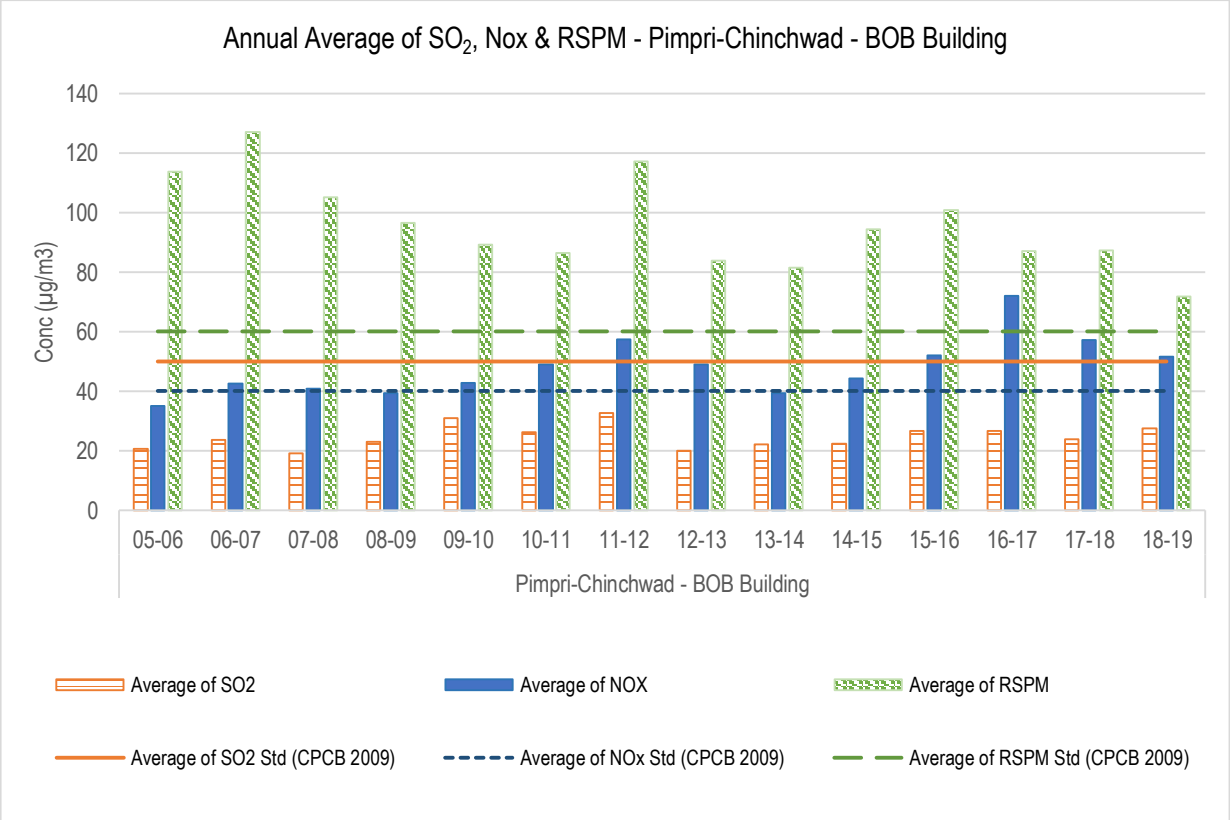


Figure No. 145: Annual average trend of SO_2, NOx, and RSPM at Pimpri - Chinchwad-BOB Building

Pune - Karve Road - CAAQMS

Table No. 145: Data for Monthly average reading recorded at Karve Road - CAAQMS

Station Name	Year	Month	Average of SO_2 ($\mu g/m^3$)	Average of NOx ($\mu g/m^3$)	Average of RSPM ($\mu g/m^3$)
Kaev Road CAAQMS	2018	Apr	21	51	106
		May	16	43	98
		Jun	13	34	60
		Jul	11	30	41
		Aug	11	29	38
		Sep	11	28	59
		Oct	10	27	103
		Nov	21	74	116
		Dec	16	70	137
	2019	Jan	9	48	158
		Feb	15	34	128
		Mar	14	28	134

Note: Monthly graphs do not have any CPCB Standard[82]

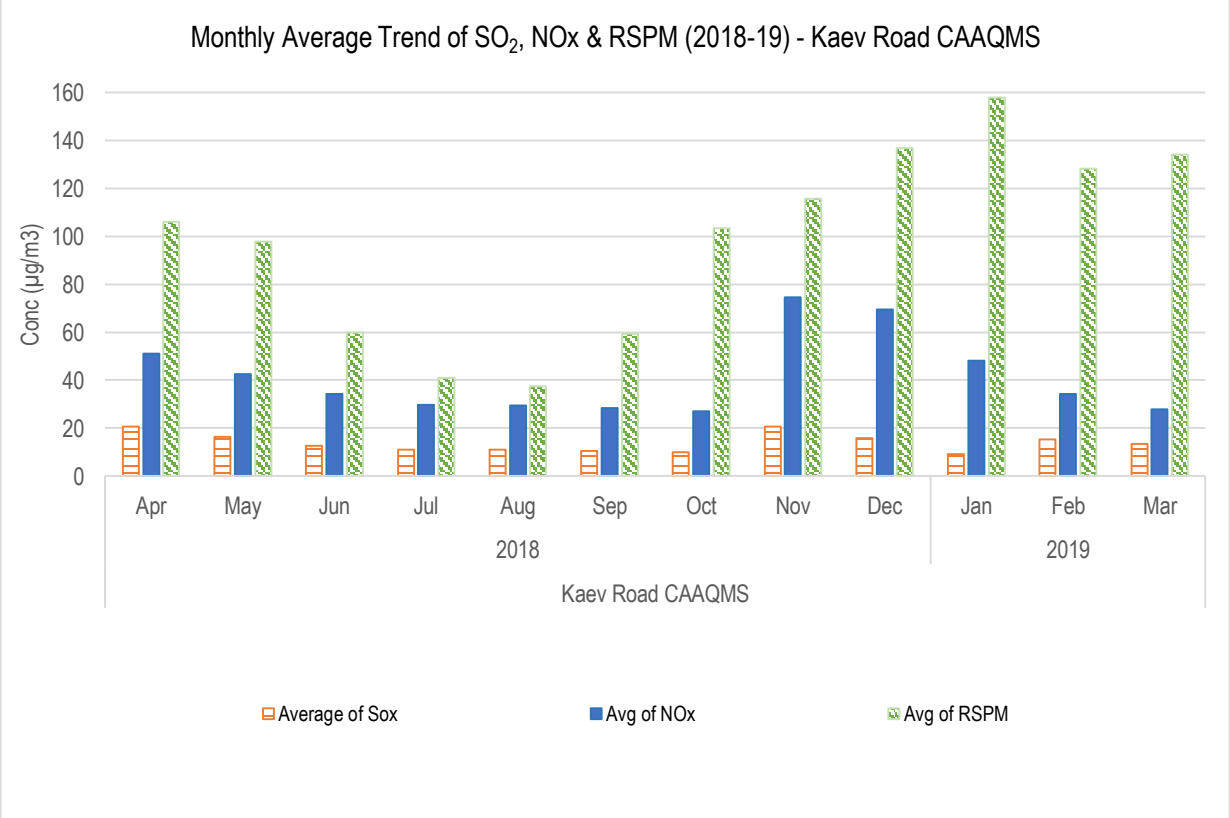


Figure No. 146: Monthly average reading recorded at Karve Road – CAAQMS

[82] https://cpcb.nic.in/air-quality-standard/

Table No. 146: Data for Annual average trend of SO_2, NOx, and RSPM at Karve Road - CAAQMS

Station Name	Year	Average of SO_2 (µg/m³)	Average of NO_X (µg/m³)	Average of RSPM (µg/m³)
Annual Permissible Limit (CPCB)		*50*	*40*	*60*
Karve Road - CAAQMS	07-08	13	43	71
	08-09	25	39	121
	09-10	11	35	109
	10-11	12	39	128
	11-12	11	49	131
	12-13	22	66	124
	13-14	27	70	121
	14-15	15	36	123
	15-16	25	57	138
	16-17	18	77	79
	17-18	24	46	73
	18-19	14	38	98

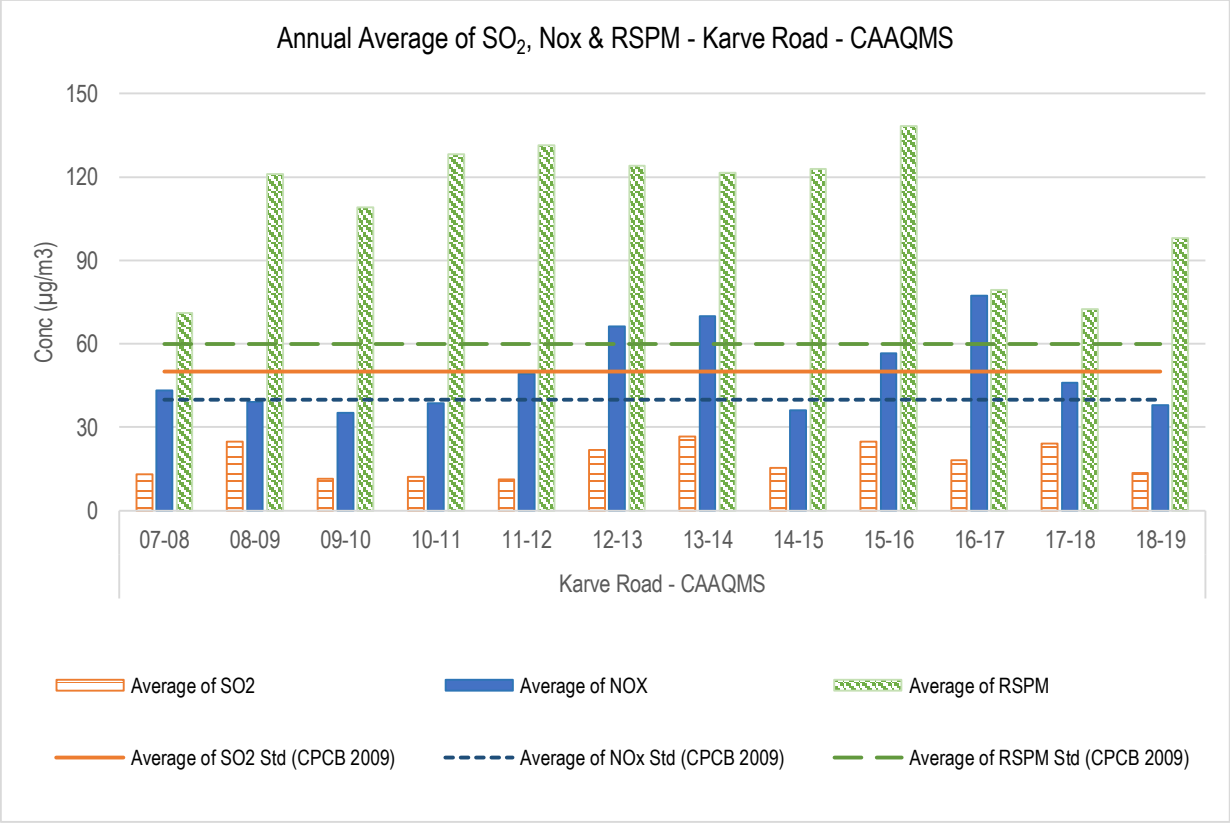


Figure No. 147: Annual average trend of SO_2, NOx, and RSPM at Karve Road – CAAQMS

Solapur - WIT Campus

Table No. 147: Data for Monthly average reading recorded at WIT Campus

Station Name	Year	Month	Average of SO_2 (µg/m³)	Average of NOx (µg/m³)	Average of RSPM (µg/m³)
WIT Campus	2018	Apr	18	37	84
		May	16	32	83
		Jun	15	32	76
		Jul	13	27	77
		Aug	13	25	64
		Sep	15	30	62
		Oct	15	33	61
		Nov	17	37	61
		Dec	18	36	63
	2019	Jan	19	36	66
		Feb	19	36	74
		Mar	19	37	73

Note: Monthly graphs do not have any CPCB Standard[83]

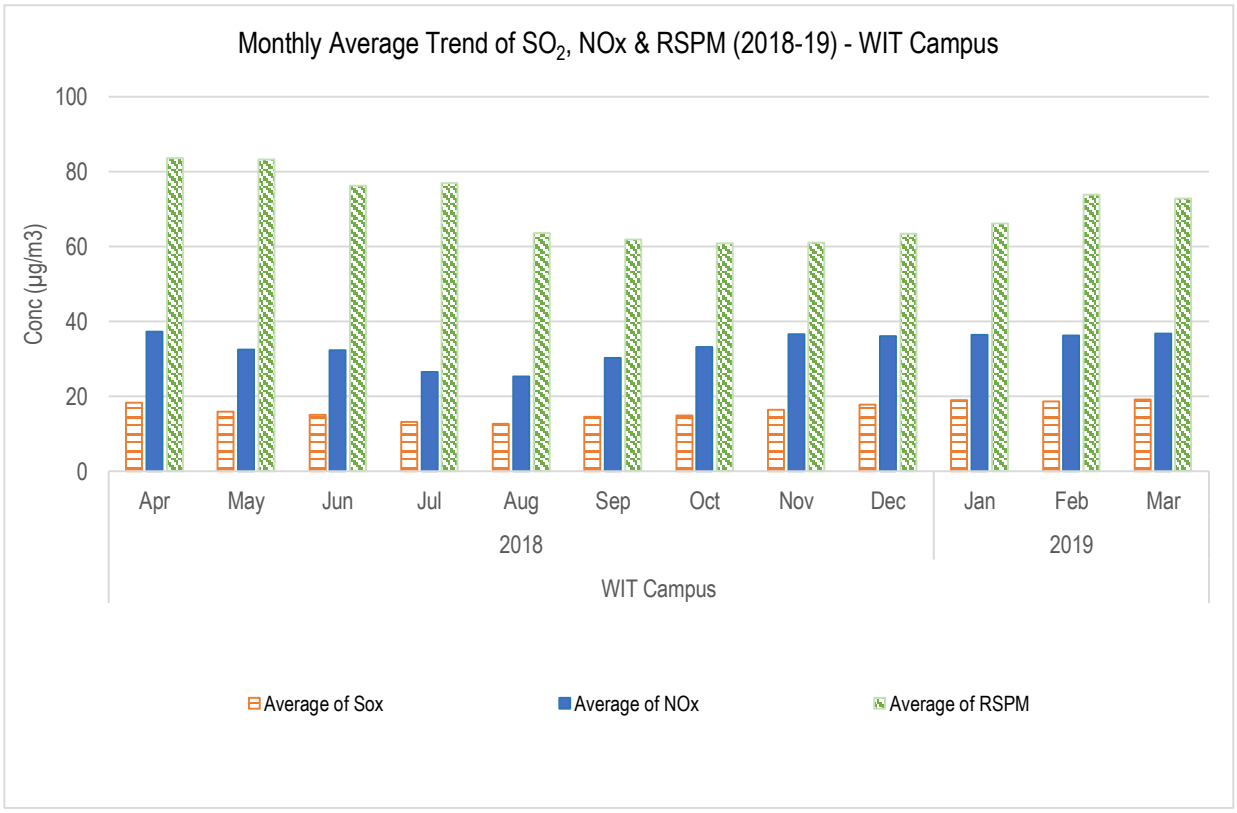


Figure No. 148: Monthly average reading recorded at WIT Campus

[83] https://cpcb.nic.in/air-quality-standard/

Table No. 148: Data for Annual average trend of SO_2, NOx, and RSPM at WIT Campus

Station Name	Year	Average of SO_2 (µg/m³)	Average of NO_X (µg/m³)	Average of RSPM (µg/m³)
Annual Permissible Limit (CPCB)		*50*	*40*	*60*
WIT Campus	04-05	18	40	137
	05-06	17	37	115
	06-07	16	35	97
	07-08	17	34	86
	08-09	17	35	76
	09-10	17	35	71
	10-11	17	35	74
	11-12	17	35	77
	12-13	17	35	78
	13-14	15	35	84
	14-15	14	34	77
	15-16	13	35	76
	16-17	13	34	69
	17-18	14	33	65
	18-19	16	33	70

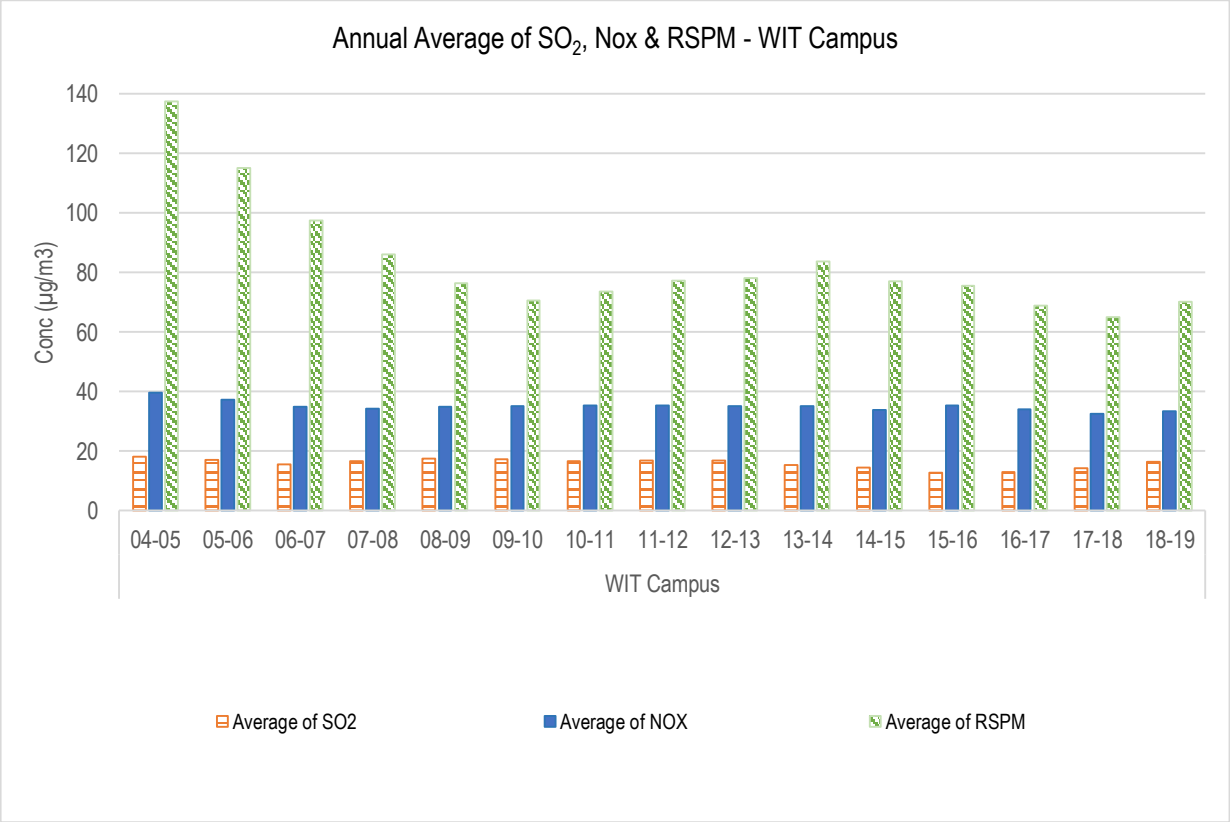


Figure No. 149: Annual average trend of SO_2, NOx, and RSPM at WIT Campus

Solapur - Saat Rasta - Chithale Clinic

Table No. 149: Data for Monthly average reading recorded at Saat Rasta - Chithale Clinic

Station Name	Year	Month	Average of SO_2 (µg/m³)	Average of NOx (µg/m³)	Average of RSPM (µg/m³)
Saat Rasta- Chithale Clinic	2018	Apr	14	33	80
		May	18	36	87
		Jun	16	34	82
		Jul	13	27	79
		Aug	13	25	64
		Sep	14	30	62
		Oct	15	33	61
		Nov	16	34	61
		Dec	17	35	60
	2019	Jan	18	36	68
		Feb	19	37	73
		Mar	18	36	76

Note: Monthly graphs do not have any CPCB Standard[84]

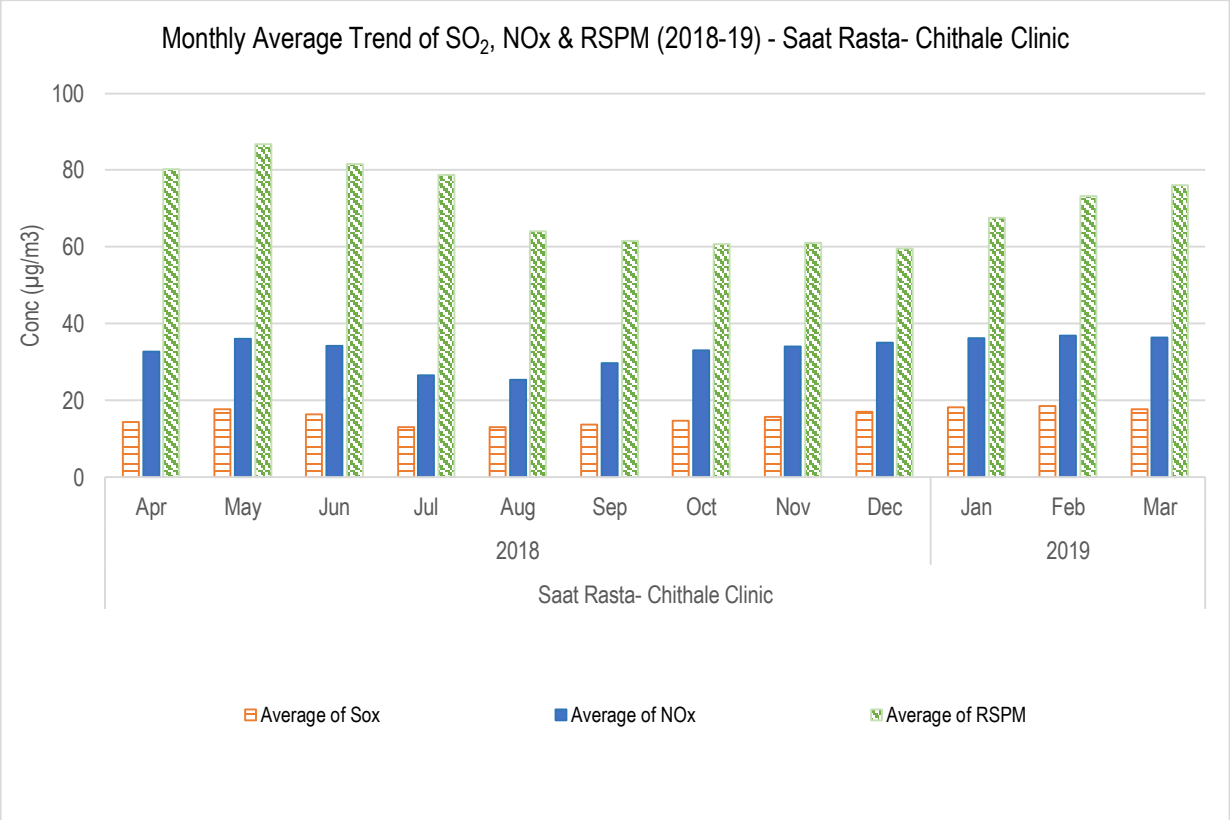


Figure No. 150: Monthly average reading recorded at Saat Rasta - Chithale Clinic

[84] https://cpcb.nic.in/air-quality-standard/

Table No. 150: Data for Annual average trend of SO_2, NOx, and RSPM at Saat Rasta - Chithale Clinic

Station Name	Year	Average of SO_2 (µg/m³)	Average of NOX (µg/m³)	Average of RSPM (µg/m³)
Annual Permissible Limit (CPCB)		*50*	*40*	*60*
Saat Rasta- Chithale Clinic	04-05	18	40	144
	05-06	18	38	125
	06-07	17	36	107
	07-08	18	34	96
	08-09	18	36	74
	09-10	17	36	66
	10-11	17	34	69
	11-12	17	35	77
	12-13	17	35	81
	13-14	16	35	77
	14-15	14	35	78
	15-16	13	37	78
	16-17	13	35	70
	17-18	14	41	77
	18-19	16	33	71

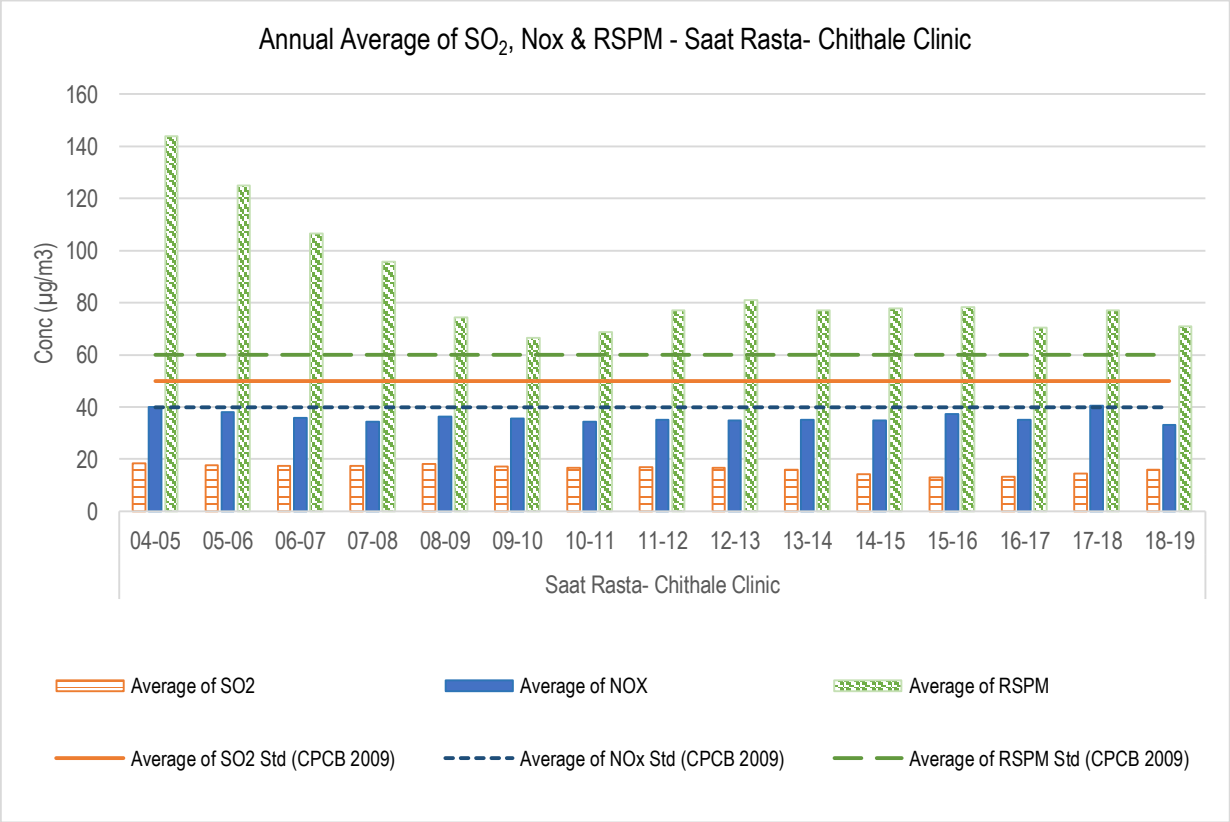


Figure No. 151: Annual average trend of SO_2, NOx, and RSPM at Saat Rasta - Chithale Clinic

Solapur - Solapur

Table No. 151: Data for Monthly average reading recorded at Solapur

Station Name	Year	Month	Average of SO2 (µg/m³)	Average of NOx (µg/m³)	Average of RSPM (µg/m³)
Solapur CAAQMS	2018	Apr	20	77	103
		May	11	45	100
		Jun	11	29	52
		Jul	15	26	44
		Aug	10	23	41
		Sep	10	40	53
		Oct	10	79	86
		Nov	11	102	124
		Dec	11	93	155
	2019	Jan	10	109	185
		Feb	11	93	141
		Mar	11	74	135

Note: Monthly graphs do not have any CPCB Standard[85]

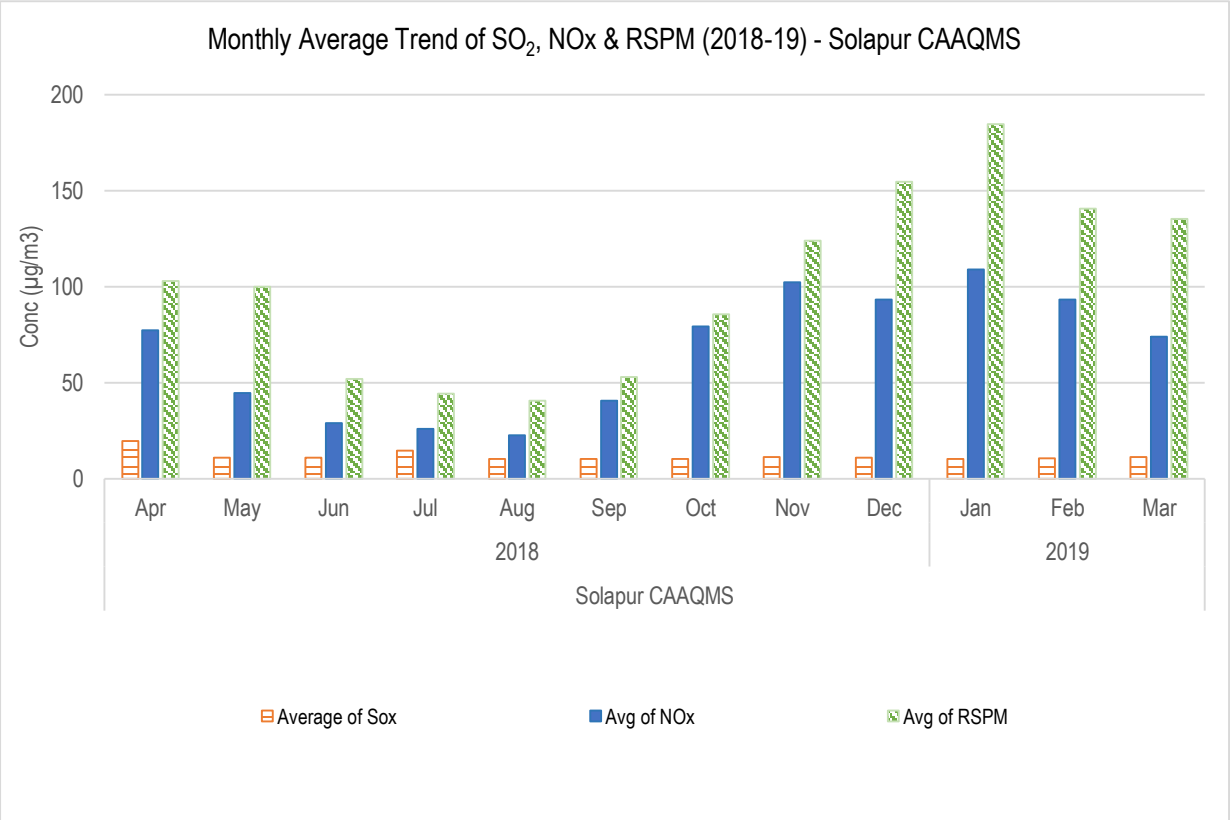


Figure No. 152: Monthly average reading recorded at Solapur

[85] https://cpcb.nic.in/air-quality-standard/

Table No. 152: Data for Annual average trend of SO_2, NOx, and RSPM at Solapur

Station Name	Year	Average of SO_2 (µg/m³)	Average of NO_X (µg/m³)	Average of RSPM (µg/m³)
Annual Permissible Limit (CPCB)		*50*	*40*	*60*
Solapur	07-08	15	31	102
	08-09	15	30	96
	10-11	13	37	112
	11-12	12	40	116
	12-13	16	42	106
	13-14	15	42	96
	14-15	9	38	104
	15-16	13	49	100
	16-17	15	41	106
	17-18	19	67	96
	18-19	12	65	101

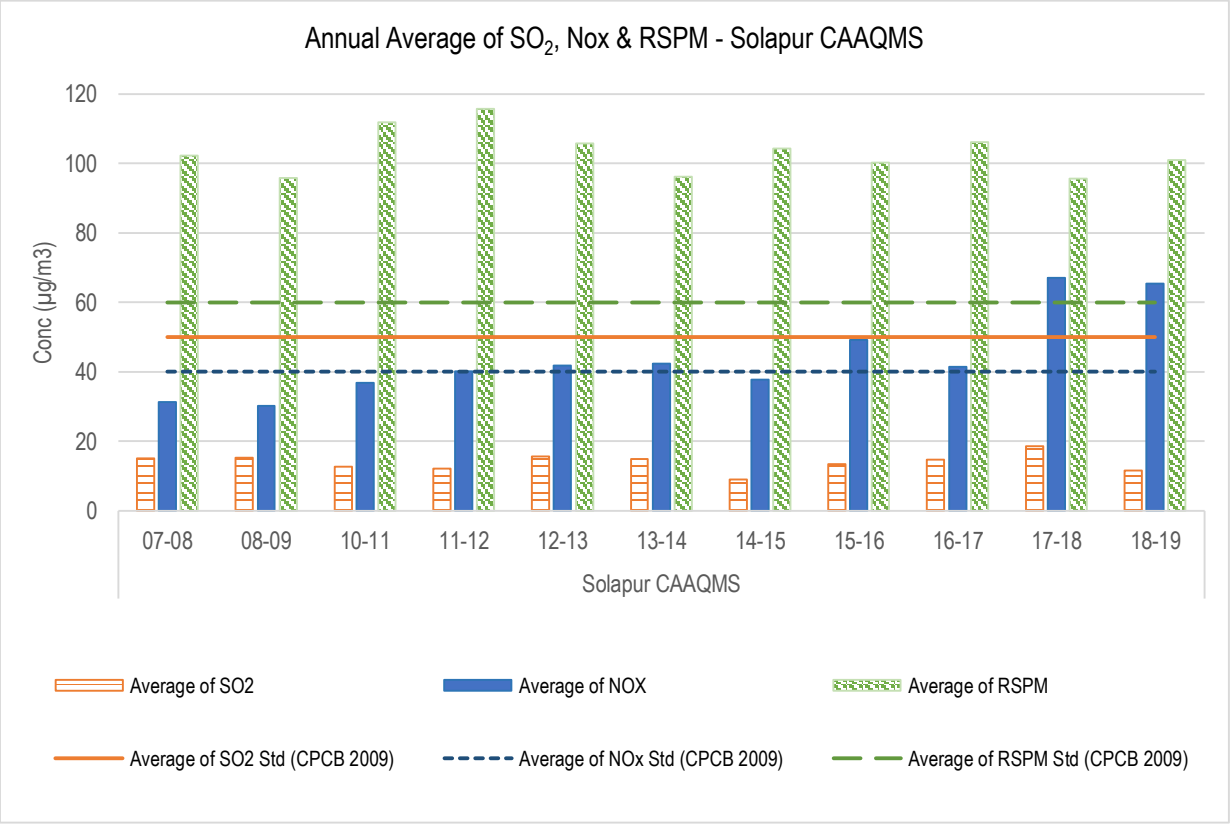
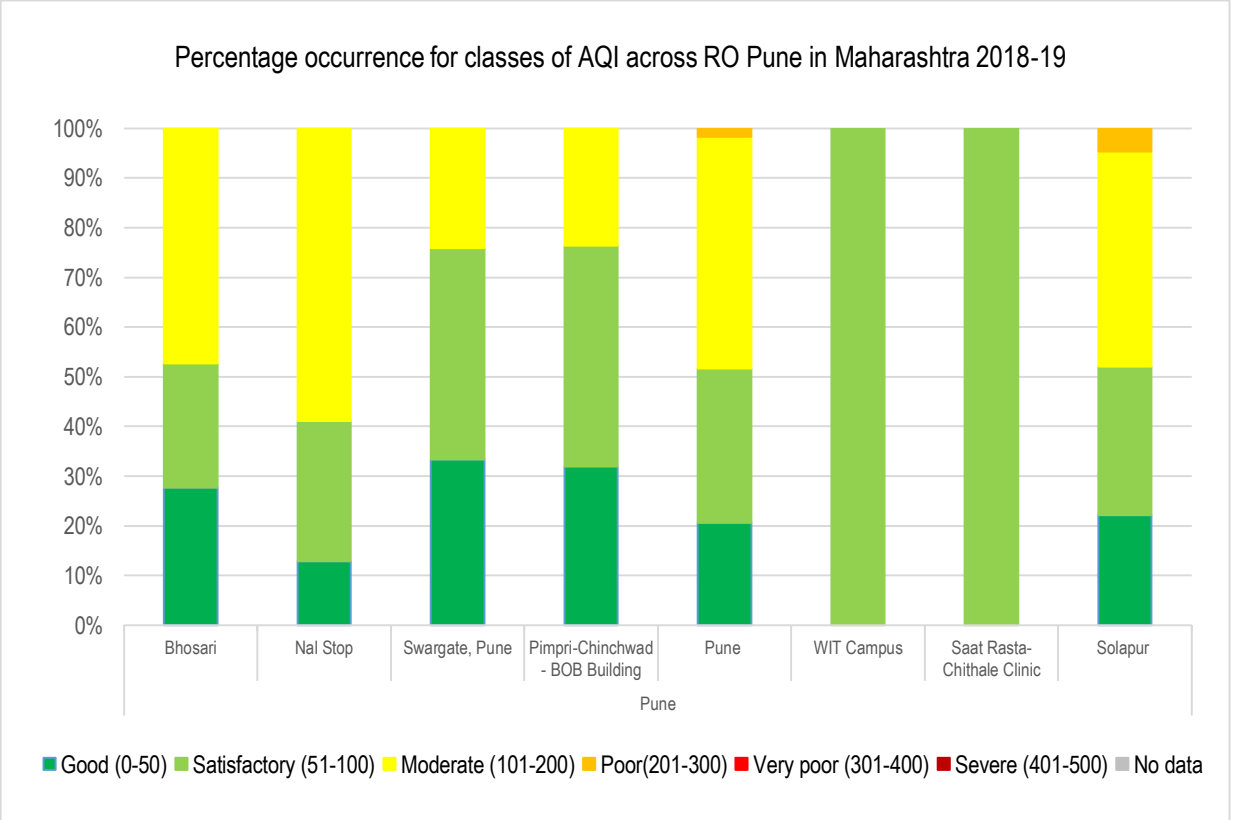


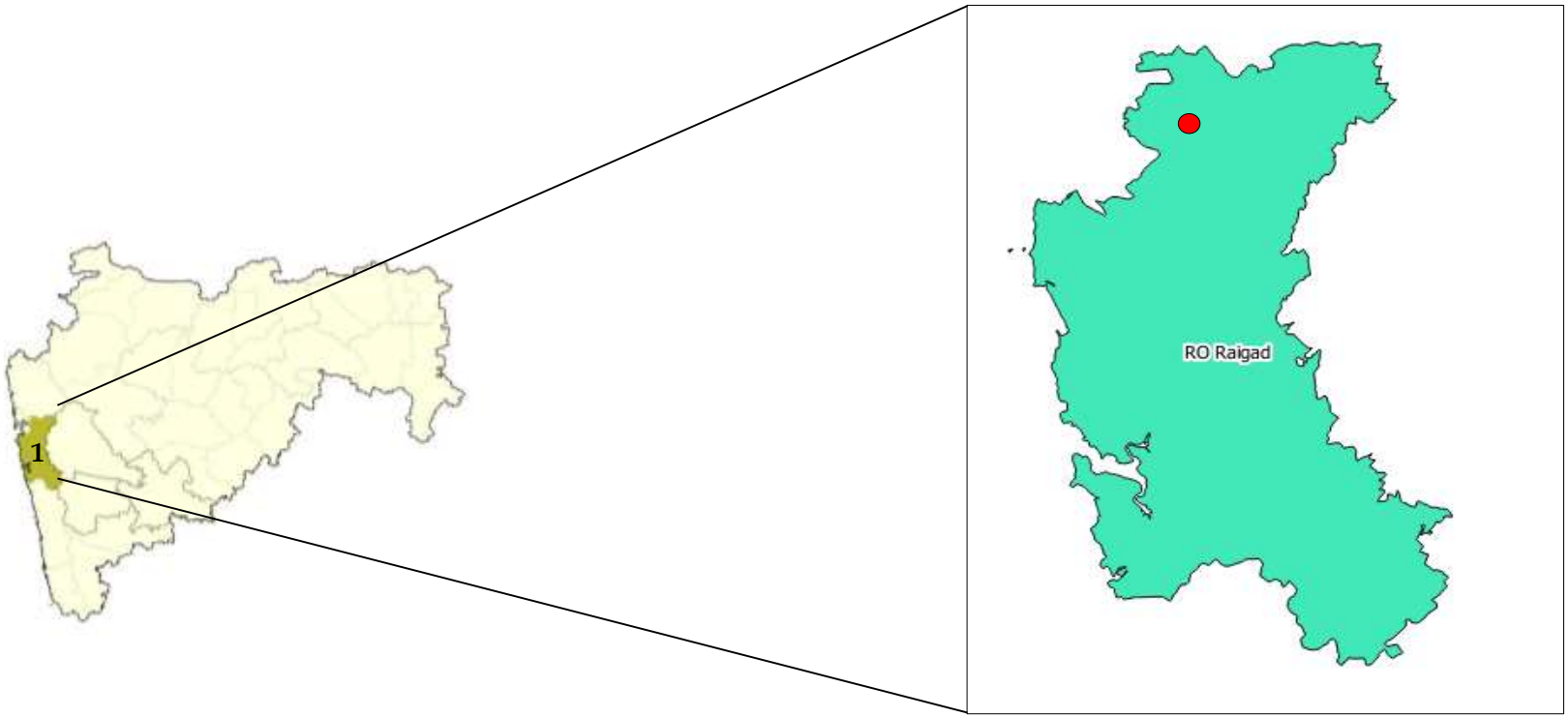
Figure No. 153: Annual average trend of SO_2, NOx, and RSPM at Solapur

Table No. 153: Percentage exceedance of pollutants at Pune RO

Station Name	Total Observations	Exceedence			% Exceedence		
		SO_2	NOx	RSPM	SO_2	NOx	RSPM
Bhosari	76	0	60	48	0	90	63
Nal Stop	78	0	43	63	0	96	81
Swargate, Pune	54	0	28	30	0	82	56
Pimpri-Chinchwad - BOB Building	241	0	128	144	0	78	60
Pune	365	0	88	272	0	27	75
WIT Campus	102	0	2	88	0	2	86
Saat Rasta- Chithale Clinic	103	0	0	84	0	0	82
Solapur CAAQMS	363	0	235	260	0	65	72



RO - Raigad



MPCB RO	Region	Station code	Station name	Type	Latitude (deg)	Longitude (deg)
Raigad	Panvel	495	Panvel- Water Supply Plant	Residential	18° 59' 23.8" N	73° 07' 03.5" E

Panvel - Panvel – Water Supply Plant

Table No. 154: Data for Monthly average reading recorded at Panvel – Water Supply Plant

Station Name	Year	Month	Average of SO_2 (µg/m³)	Average of NOx (µg/m³)	Average of RSPM (µg/m³)
Panvel- Water Supply Plant	2018	Apr	24	62	86
		May	20	52	88
		Jun	19	55	81
		Jul	15	50	51
		Aug	15	38	39
		Sep	23	47	43
		Oct	20	46	62
		Nov	18	43	53
		Dec	18	42	56
	2019	Jan	19	54	58
		Feb	18	46	45
		Mar	21	53	50

Note: Monthly graphs do not have any CPCB Standard[86]

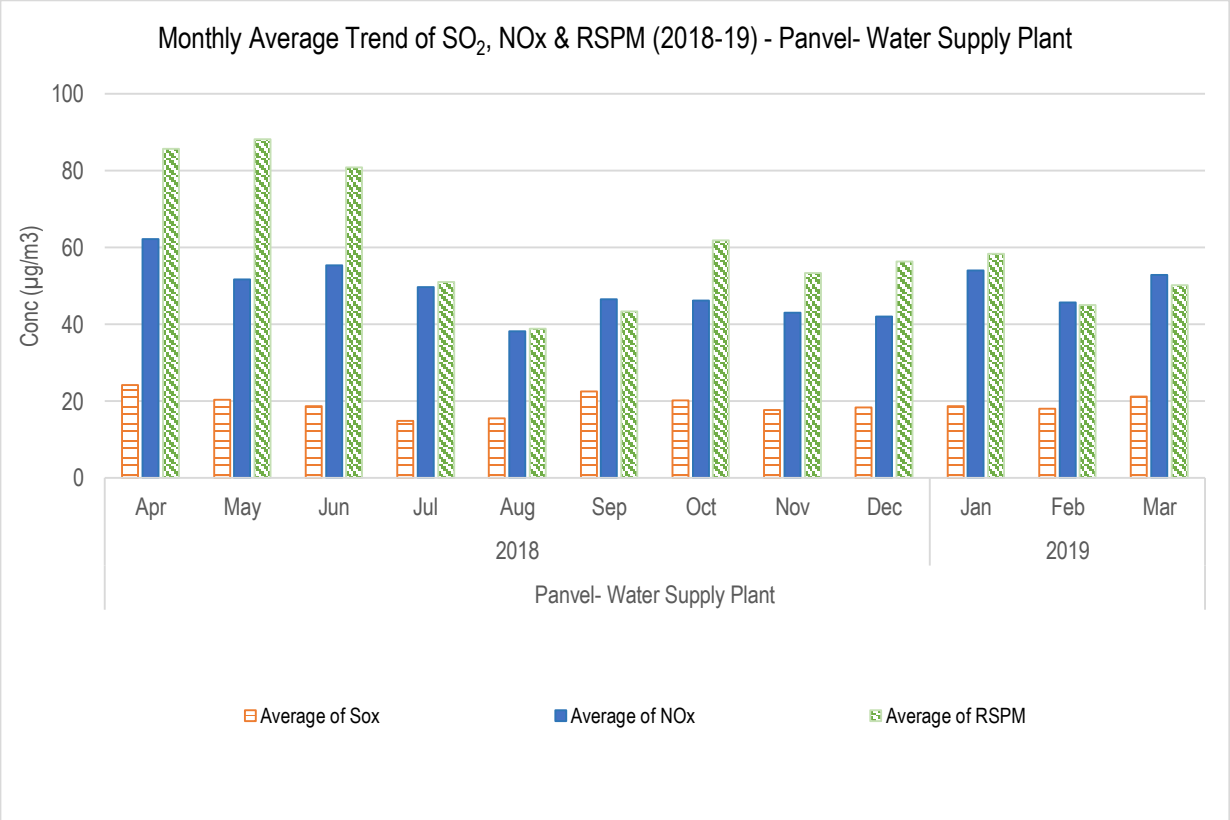


Figure No. 154: Monthly average reading recorded at Panvel – Water Supply Plant

[86] https://cpcb.nic.in/air-quality-standard/

Table No. 155: Data for Annual average trend of SO_2, NOx, and RSPM at Panvel – Water Supply Plant

Station Name	Year	Average of SO_2 ($\mu g/m^3$)	Average of NO_X ($\mu g/m^3$)	Average of RSPM ($\mu g/m^3$)
Annual Permissible Limit (CPCB)		*50*	*40*	*60*
Panvel- Water Supply Plant	06-07	14	35	115
	07-08	12	37	143
	08-09	14	40	132
	09-10	12	42	71
	10-11	15	35	119
	11-12	15	42	140
	12-13	16	42	168
	13-14	16	41	203
	14-15	17	38	136
	15-16	18	43	137
	16-17	19	49	112
	17-18	22	47	104
	18-19	19	49	60

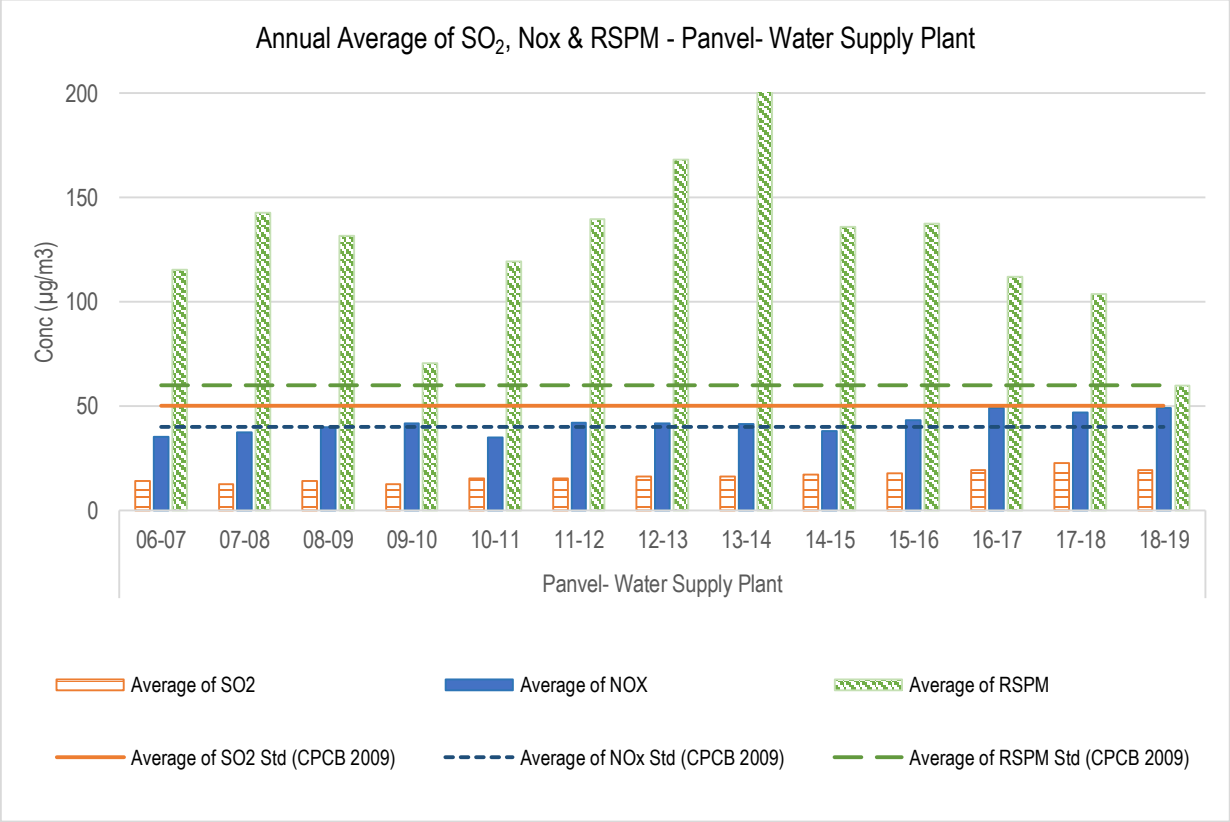
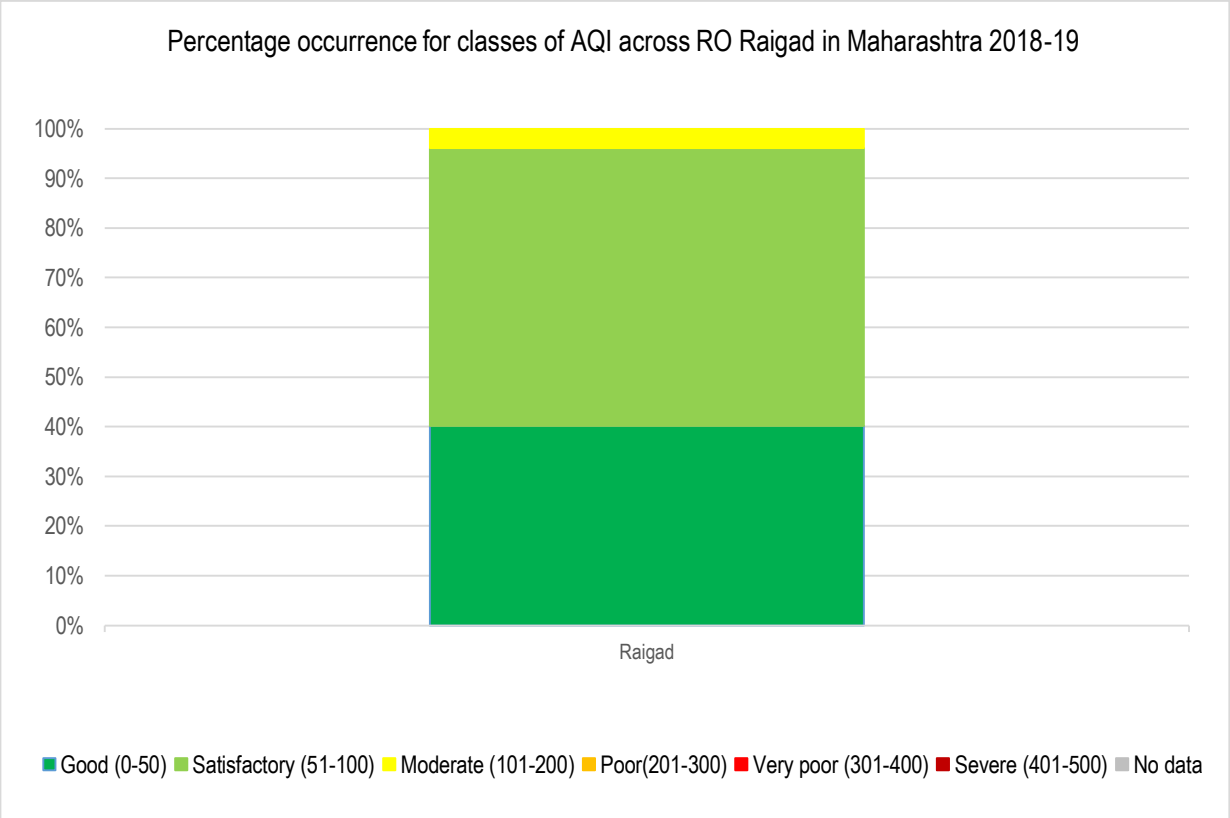


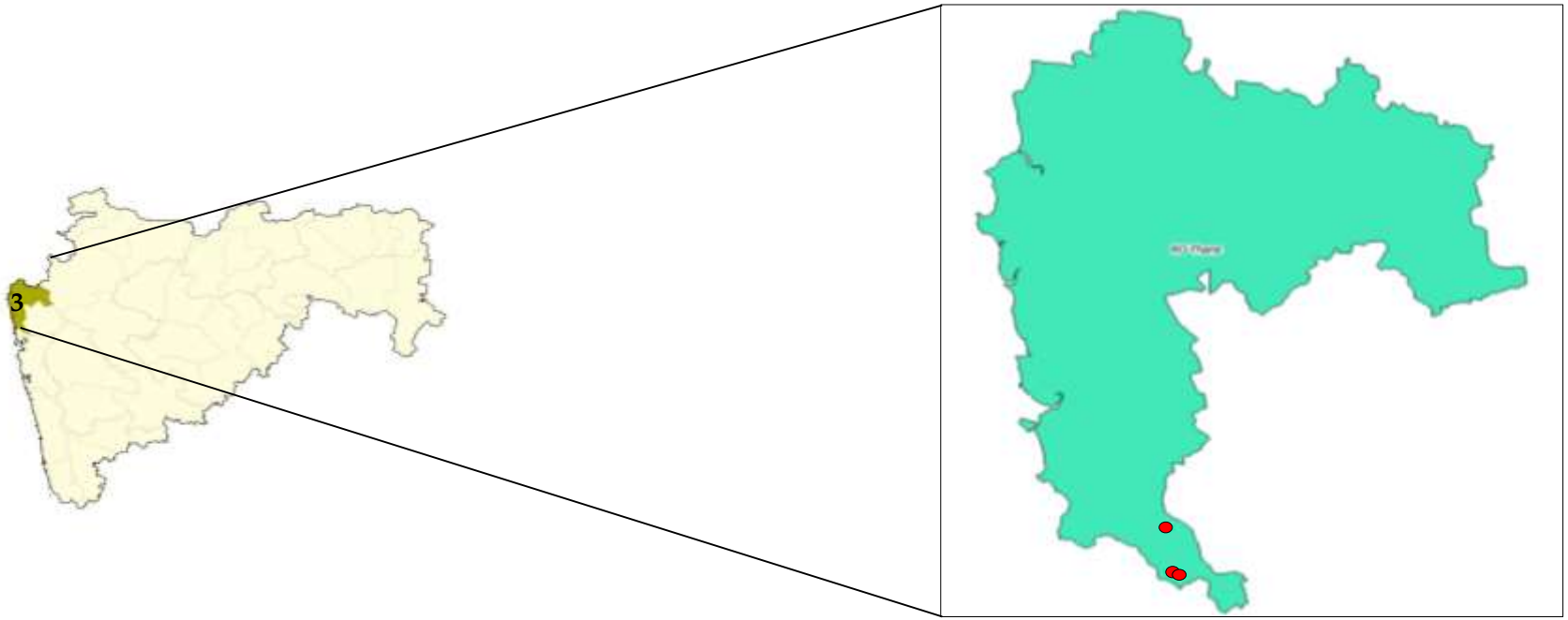
Figure No. 155: Annual average trend of SO_2, NOx, and RSPM at Panvel – Water Supply Plant

Table No. 156: Percentage exceedance of pollutants at Raigad RO

Station Name	Total Observations	Exceedence			% Exceedence		
		SO_2	NOx	RSPM	SO_2	NOx	RSPM
Panvel- Water Supply Plant	102	0	91	42	0	89	41



RO - Thane



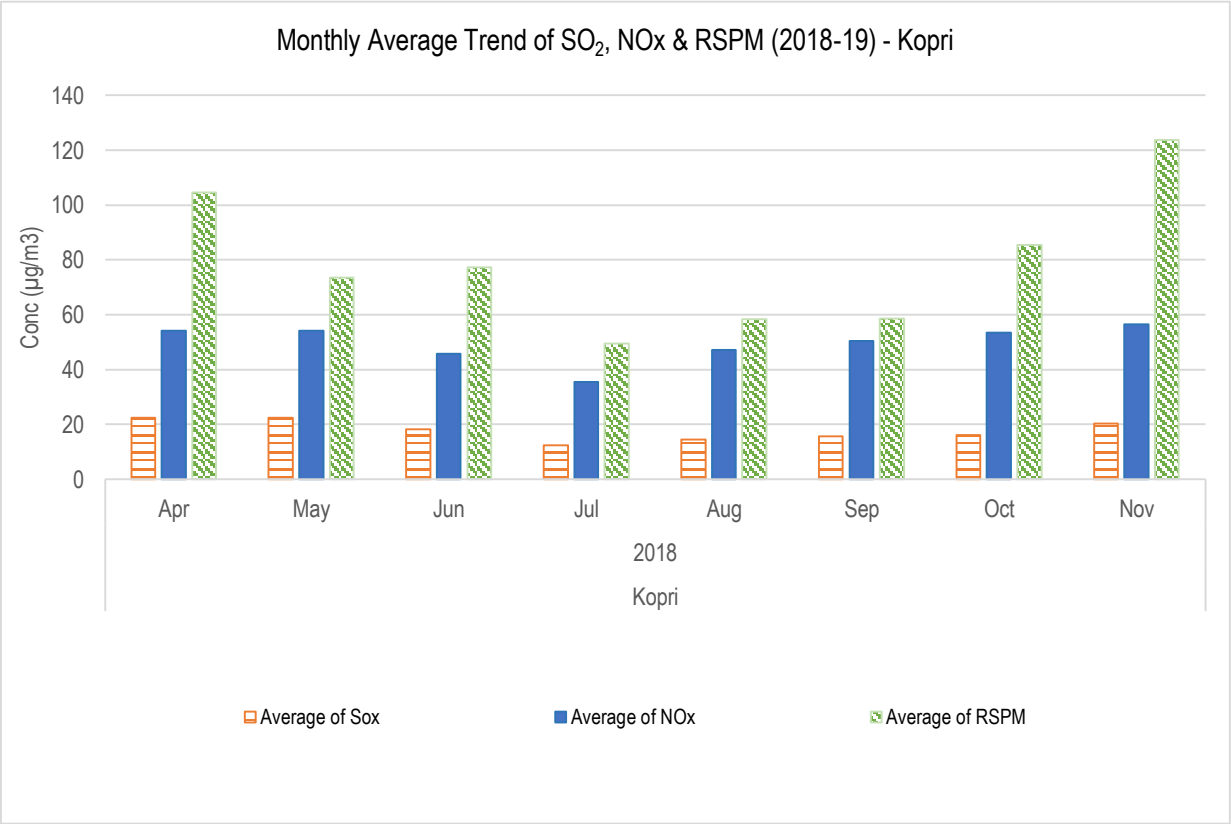
MPCB RO	Region	Station code	Station name	Type	Latitude (deg)	Longitude (deg)
Thane	Thane	303	Kopri	Residential	19° 10' 55.3" N	72° 58' 17.1" E
	Thane	304	Naupada	Rural and other areas	19° 11' 17.4" N	72° 58' 04.1" E
	Thane		Balkum/Glaxo	Industrial	19° 13' 05.8" N	72° 57' 59.7" E

Thane - Kopri

Table No. 157: Data for Monthly average reading recorded at Kopri

Station Name	Year	Month	Average of SO_2 (µg/m³)	Average of NOx (µg/m³)	Average of RSPM (µg/m³)
Kopri	2018	Apr	22	54	105
		May	23	54	73
		Jun	18	46	77
		Jul	12	35	50
		Aug	15	47	58
		Sep	16	50	59
		Oct	16	54	86
		Nov	20	57	124

Note: Monthly graphs do not have any CPCB Standard[87]



Figu re No. 156: Monthly average reading recorded at Kopri
Note: Data for the month of December 2018 to March 2019 is not available

[87] https://cpcb.nic.in/air-quality-standard/

Table No. 158: Data for Annual average trend of SO_2, NOx, and RSPM at Kopri

Station Name	Year	Average of SO_2 (µg/m³)	Average of NO_X (µg/m³)	Average of RSPM (µg/m³)
Annual Permissible Limit (CPCB)		*50*	*40*	*60*
Kopri	04-05	8	11	45
	05-06	6	9	51
	06-07	12	10	51
	07-08	11	10	50
	08-09	11	16	60
	09-10	11	13	50
	10-11	12	11	46
	11-12	12	9	60
	12-13	20	15	86
	13-14	16	41	114
	14-15	21	61	106
	15-16	27	62	136
	16-17	18	59	117
	17-18	19	46	121
	18-19	17	49	75

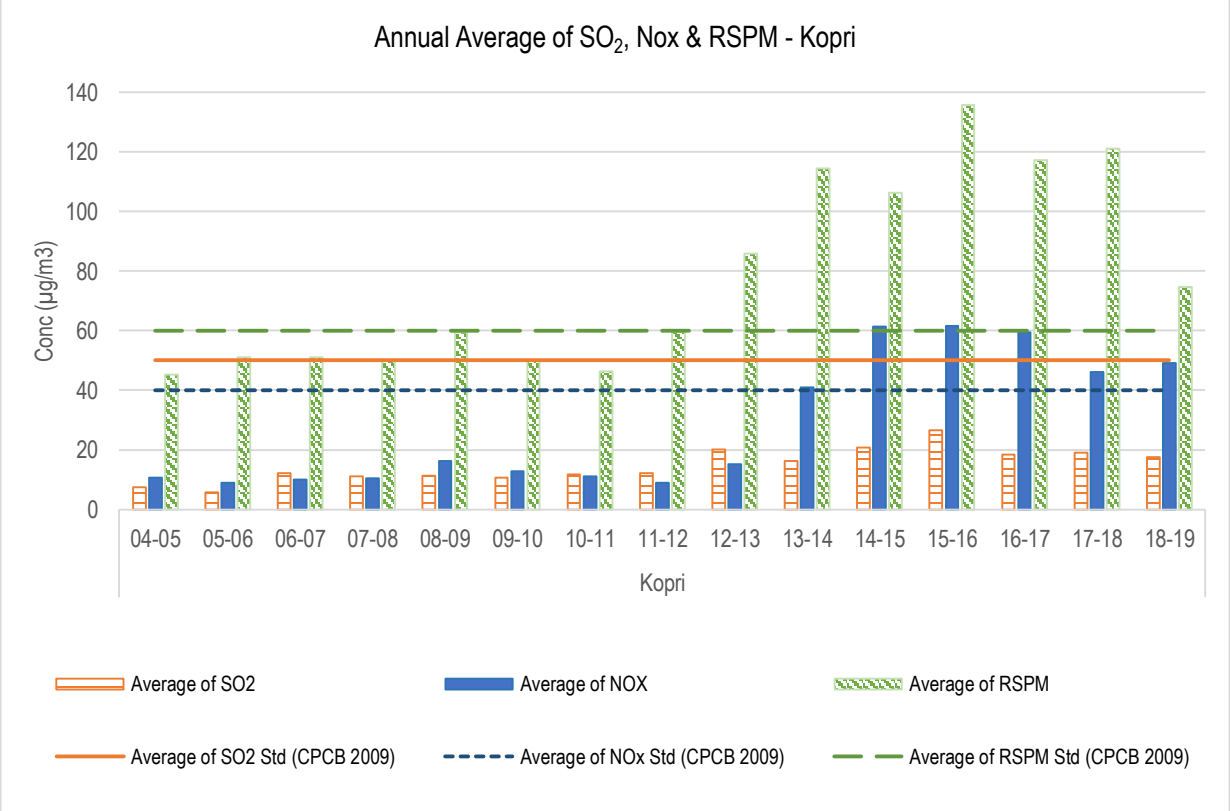


Figure No. 157: Annual average trend of SO_2, NOx, and RSPM at Kopri

Thane - Naupada

Table No. 159: Data for Monthly average reading recorded at Naupada

Station Name	Year	Month	Average of SO_2 (µg/m³)	Average of NOx (µg/m³)	Average of RSPM (µg/m³)
Naupada	2018	Apr	22	56	117
		May	19	52	82
		Jun	13	42	59
		Jul	13	42	51
		Aug	16	47	95
		Sep	16	51	112
		Oct	16	52	109
		Nov	16	48	133

Note: Monthly graphs do not have any CPCB Standard[88]

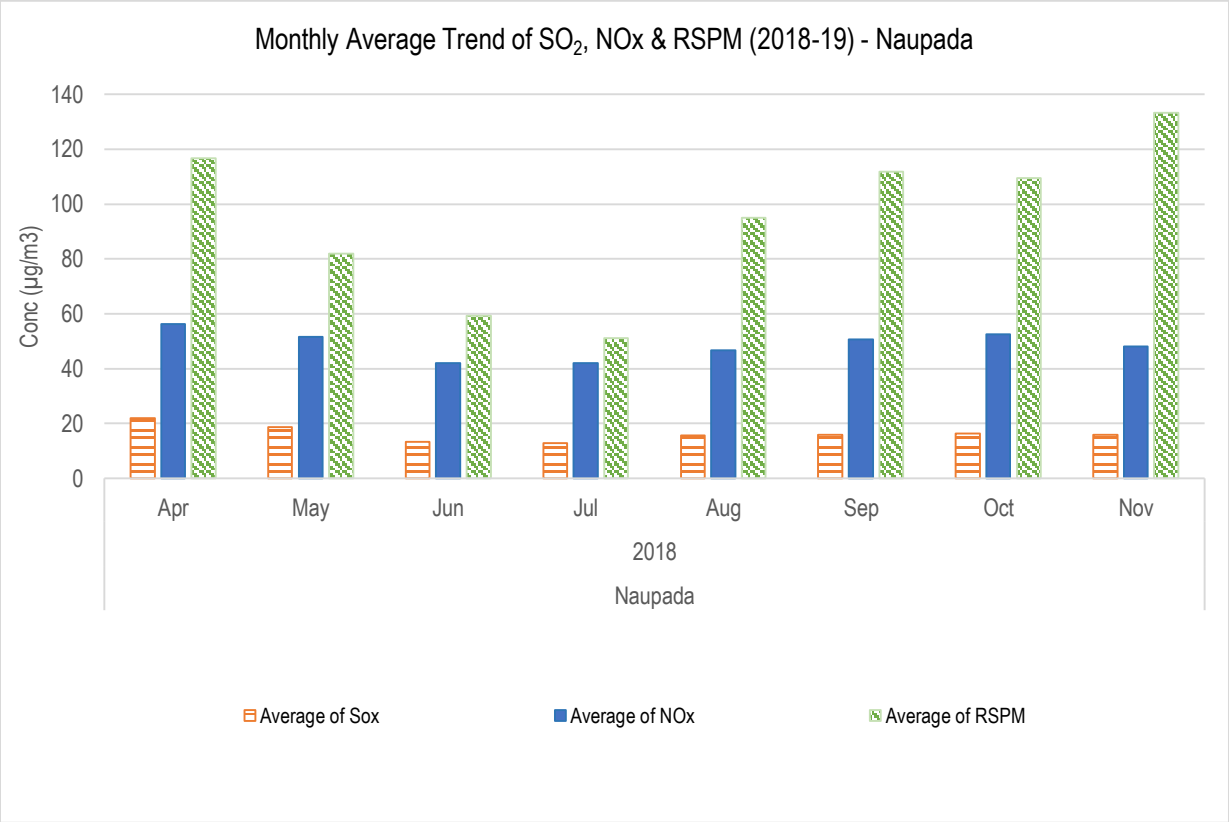


Figure No. 158: Monthly average reading recorded at Naupada

Data for the month of December 2018 to March 2019 is not available

[88] https://cpcb.nic.in/air-quality-standard/

Table No. 160: Data for Annual average trend of SO_2, NOx, and RSPM at Naupada

Station Name	Year	Average of SO_2 (µg/m³)	Average of NO_X (µg/m³)	Average of RSPM (µg/m³)
Annual Permissible Limit (CPCB)		*50*	*40*	*60*
Naupada	04-05	8	11	46
	05-06	6	10	51
	06-07	12	9	52
	07-08	11	10	50
	08-09	11	15	60
	09-10	14	21	55
	10-11	14	13	48
	11-12	13	10	56
	12-13	21	16	93
	13-14	17	43	113
	14-15	21	62	104
	15-16	28	63	102
	16-17	19	61	108
	17-18	19	48	119
	18-19	16	49	91

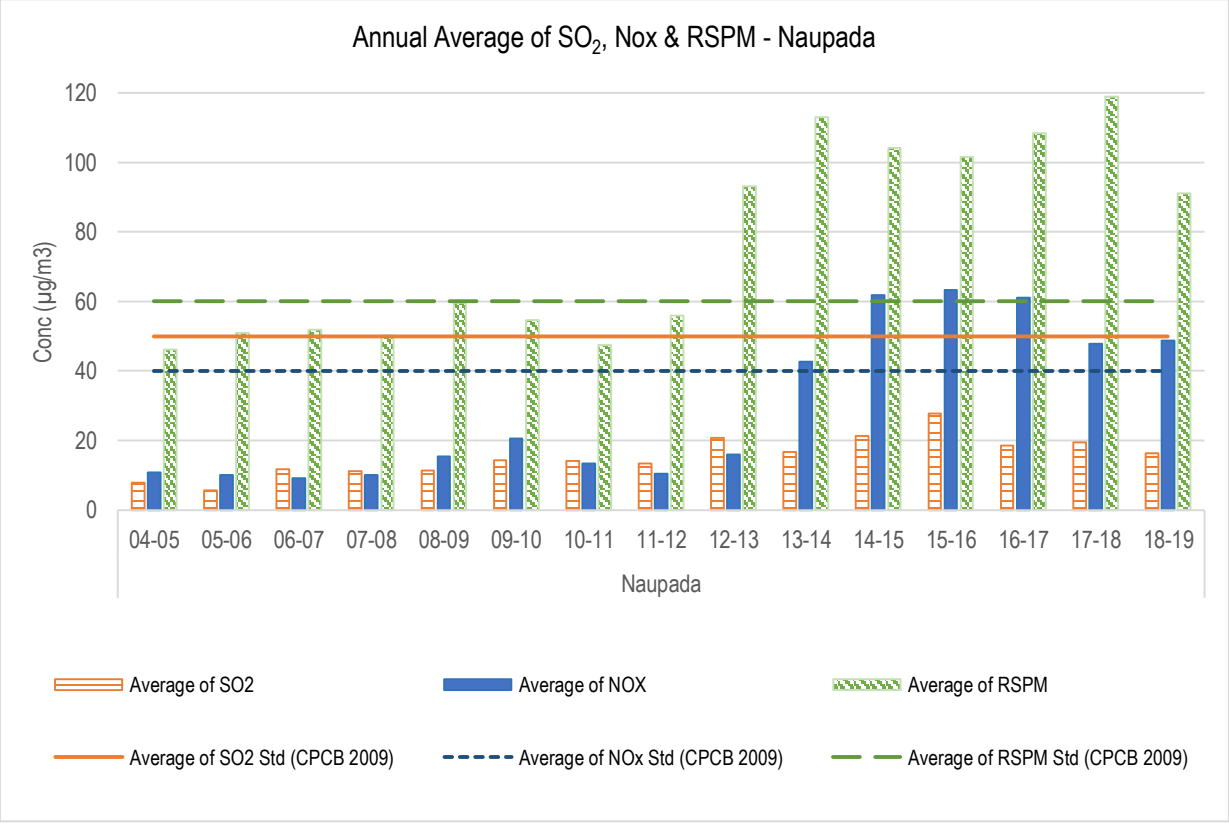


Figure No. 159: Annual average trend of SO_2, NOx, and RSPM at Naupada

Thane - Balkum Glaxo

Table No. 161: Data for Monthly average reading recorded at Balkum Glaxo

Station Name	Year	Month	Average of SO_2 (µg/m³)	Average of NOx (µg/m³)	Average of RSPM (µg/m³)
Balkum/ Glaxo	2018	Apr	13	28	142
		May	12	25	131
		Jun	11	30	91
		Jul	12	31	89
		Aug	13	32	88
		Sep	13	33	90
		Oct	14	36	108
		Nov	16	44	144

Note: Monthly graphs do not have any CPCB Standard[89]

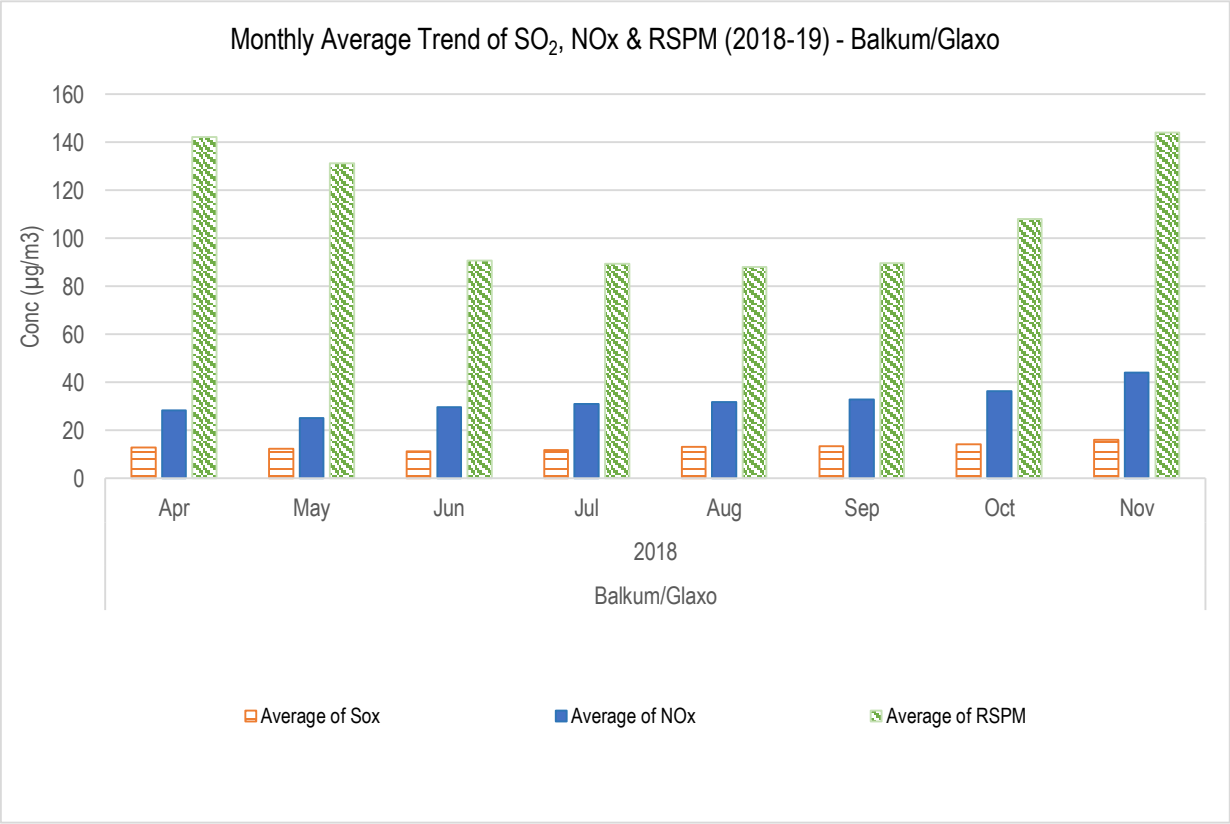


Figure No. 160: Monthly average reading recorded at Balkum Glaxo
Data for the month of December 2018 to March 2019 is not available

[89] https://cpcb.nic.in/air-quality-standard/

Table No. 162: Data for Annual average trend of SO_2, NOx, and RSPM at Balkum Glaxo

Station Name	Year	Average of SO_2 (µg/m³)	Average of NO_X (µg/m³)	Average of RSPM (µg/m³)
Annual Permissible Limit (CPCB)		*50*	*40*	*60*
Balkum/Glaxo	13-14	15	34	107
	14-15	20	60	131
	15-16	24	58	132
	16-17	15	52	122
	17-18	15	35	136
	18-19	13	31	107

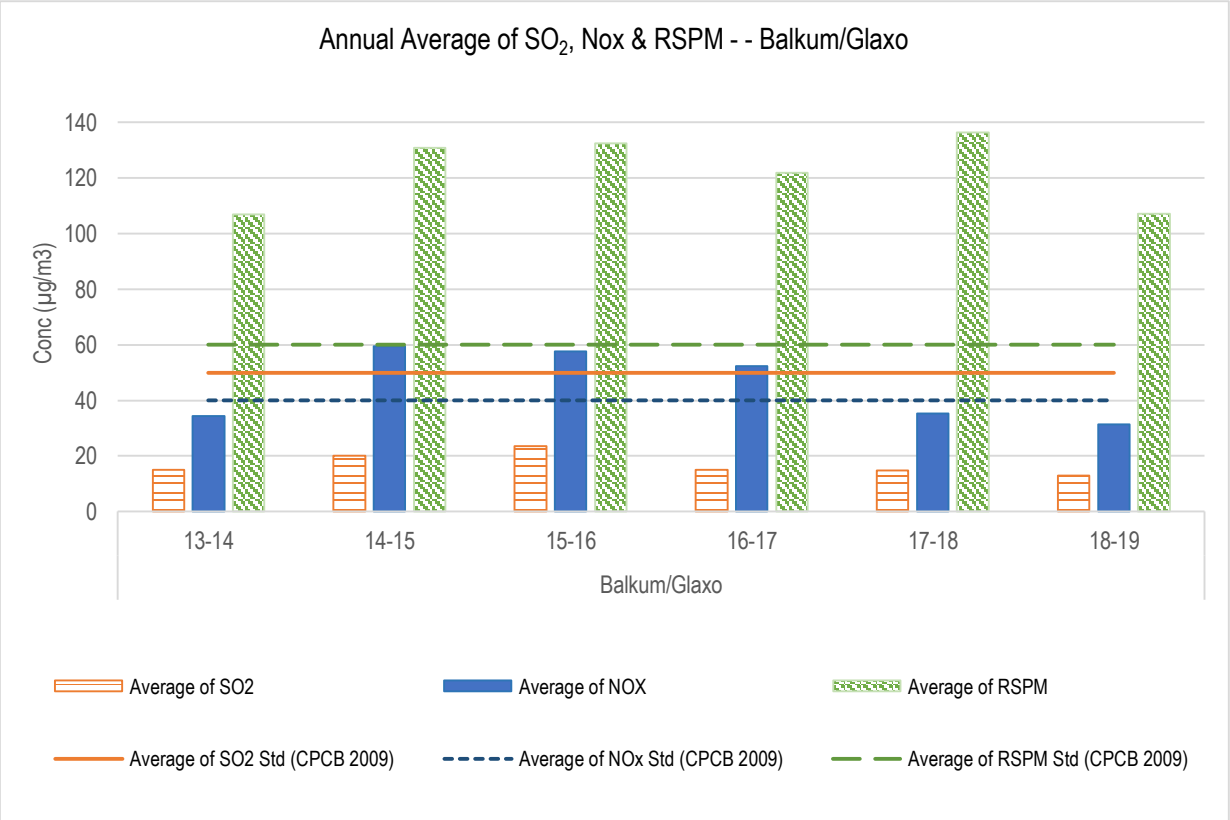
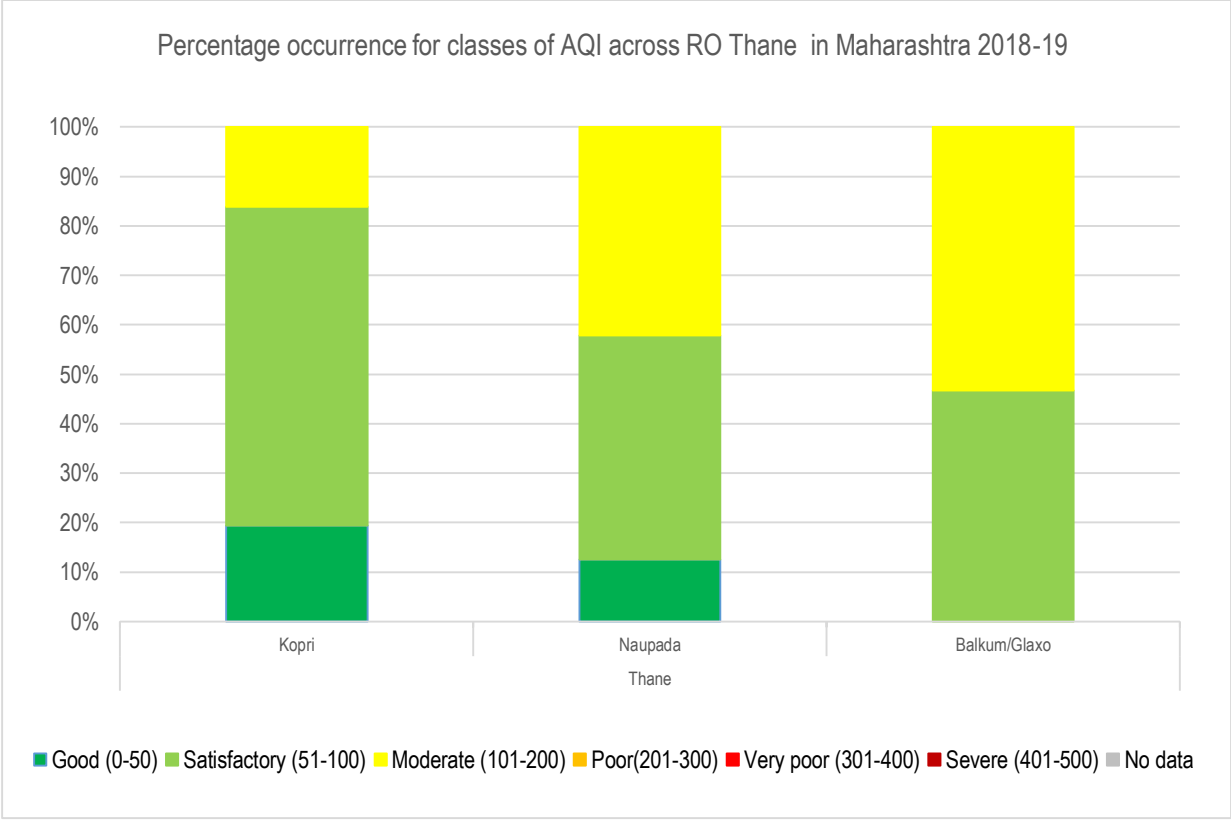


Figure No. 161: Annual average trend of SO_2, NOx, and RSPM at Balkum Glaxo

Table No. 163: Percentage exceedance of pollutants at Thane RO

Station Name	Total Observations	Exceedence			% Exceedence		
		SO_2	NOx	RSPM	SO_2	NOx	RSPM
Kopri	64	0	57	41	0	89	66
Naupada	65	0	59	49	0	91	77
Balkum/Glaxo	63	0	3	58	0	5	97



Annex -1: List of Active AAQMS in Maharashtra (2018-19)

MPCB RO	Region	Station code	Station name	Type	Program
Amravati	Akola	700	LRT Commerce College	Residential	NAMP
	Akola	701	MIDC Water Works - Akola	Industrial	NAMP
	Akola	702	Akola- College of Engg & Technology	Commercial	NAMP
	Amravati	547	Raj Kamal Chowk	Rural and other areas	NAMP
	Amravati	548	Govt. College of Engineering	Residential	NAMP
	Amravati	549	Godhadiwala Private Limited	Industrial	NAMP
Aurangabad	Aurangabad	511	SBES College	Residential	NAMP
	Aurangabad	512	Collector Office, Aurangabad	Residential	NAMP
	Aurangabad	513	C.A.D.A. Office	Residential	NAMP
	Aurangabad		Aurangabad CAAQMS	Industrial	CAAQMS
	Jalna	706	Jalna- Bachat Bhavan	Residential	NAMP
	Jalna	707	Jalna- Krishnadhan seeds Ltd	Industrial	NAMP
	Latur	641	MIDC Water Works - Latur	Industrial	NAMP
	Latur	642	Shyam Nagar-Kshewraj Vidyalaya	Residential	NAMP
	Latur	643	Ganj Golai - Sidhheshwar Bank	Rural and other areas	NAMP
Chandrapur	Chandrapur	267	Ghuggus	Residential	NAMP
	Chandrapur	281	Chandrapur - MIDC	Industrial	NAMP
	Chandrapur	396	Chandrapur - SRO MPCB	Residential	NAMP
	Chandrapur	638	Tadali MIDC	Industrial	NAMP
	Chandrapur	639	Ballarshah	Residential	NAMP
	Chandrapur	640	Rajura	Industrial	NAMP
	Chandrapur		Chandrapur CAAQMS	Industrial	CAAQMS
	Chandrapur		Civil lines,Chandrapur	Commercial	CAAQMS
Kalyan	Ambernath	445	Ambernath	Rural and other areas	NAMP
	Badlapur	649	Badlapur - BIWA House	Rural and other areas	NAMP
	Bhiwandi	823	I.G.M. Hospital	Rural and other areas	NAMP
	Bhiwandi	822	Prematai hall	Rural and other areas	NAMP

MPCB RO	Region	Station code	Station name	Type	Program
	Dombivali	265	Dombivali	Industrial	NAMP
	Dombivali	-	MIDC Office Dombivali	Rural and other areas	SAMP
	Dombivali		Dombivali CAAQMS	Industrial	CAAQMS
	Kalyan	824	MPCB RO Kalyan office	Rural and other areas	NAMP
	Ulhasnagar	647	Smt. CHM College Campus	Rural and other areas	NAMP
	Ulhasnagar	648	Powai Chowk	Rural and other areas	NAMP
Kolhapur	Kolhapur	508	Shivaji University Campus	Residential	NAMP
	Kolhapur	509	Ruikar Trust	Rural and other areas	NAMP
	Kolhapur	510	Mahadwar Road	Residential	NAMP
	Sangli	574	Terrace of SRO-Sangli, Udyog Bhavan	Residential	NAMP
	Sangli	575	Sangli-Miraj Primary Municipal school	Rural and other areas	NAMP
	Sangli	576	Krishna Valley school	Industrial	NAMP
Mumbai	Mumbai	-	Bandra	Residential	CAAQMS
	Mumbai	441	Sion	Residential	NAMP
Nagpur	Nagpur	287	IOE North Ambazari road	Residential	NAMP
	Nagpur	288	MIDC Office, Hingna Road	Industrial	NAMP
	Nagpur	314	Govt Polytechnic Col, Sadar	Rural and other areas	NAMP
	Nagpur	711	Civil lines Nagpur	Residential	NAMP
	Nagpur		Nagpur CAAQMS	Commercial	CAAQMS
Nashik	Jalgaon	644	Old B. J. Market	Residential	NAMP
	Jalgaon	645	Girna Water Tank	Residential	NAMP
	Jalgaon	646	MIDC Jalgaon	Industrial	NAMP
	Nashik	259	RTO Colony	Residential	NAMP
	Nashik	269	MIDC Satpur - VIP	Industrial	NAMP
	Nashik	280	NMC Nashik	Residential	NAMP
	Nashik	710	SRO Office Nashik	Residential	NAMP
	Nashik		Nashik CAAQMS	Commercial	CAAQMS
Navi Mumbai	Navi Mumbai	491	Rabale	Industrial	NAMP
	Navi Mumbai	492	Nerul - DY Patil	Residential	NAMP

MPCB RO	Region	Station code	Station name	Type	Program
	Navi Mumbai	493	Mahape, MPCB-Nirmal Bhavan	Industrial	NAMP
	Navi Mumbai	-	Airoli	Rural and other areas	CAAQMS
	Taloja	494	Kharghar - CIDCO Nodal Office	Residential	NAMP
	Taloja	496	Taloja - MIDC Building	Industrial	NAMP
Pune	Pune	312	Bhosari	Industrial	NAMP
	Pune	379	Nal Stop	Rural and other areas	NAMP
	Pune	381	Swargate, Pune	Residential	NAMP
	Pune	708	Pimpri-Chinchwad - BOB Building	Residential	NAMP
	Pune	-	Karve Road - CAAQMS	Residential	CAAQMS
	Solapur	299	WIT Campus	Residential	NAMP
	Solapur	300	Saat Rasta- Chithale Clinic	Residential	NAMP
	Solapur		Solapur	Residential	CAAQMS
Raigad	Panvel	495	Panvel- Water Supply Plant	Residential	NAMP
Thane	Thane	303	Kopri	Residential	NAMP
	Thane	304	Naupada	Rural and other areas	NAMP
	Thane	305	Balkum/Glaxo	Industrial	NAMP

Appendix –A: Revised NAAQS 2009

रजिस्ट्री सं० डी० एल०-33004/99 REGD. NO. D. L.-33004/99

भारत का राजपत्र
The Gazette of India

असाधारण
EXTRAORDINARY
भाग III—खण्ड 4
PART III—Section 4
प्राधिकार से प्रकाशित
PUBLISHED BY AUTHORITY

सं. 217] नई दिल्ली, बुधवार, नवम्बर 18, 2009/कार्तिक 27, 1931
No. 217] NEW DELHI, WEDNESDAY, NOVEMBER 18, 2009/KARTIKA 27, 1931

राष्ट्रीय परिवेशी वायु गुणवत्ता मानक
केन्द्रीय प्रदूषण नियंत्रण बोर्ड
अधिसूचना
नई दिल्ली, 18 नवम्बर, 2009

सं. बी-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 आधारित औसत	परिवेशी वायु में सान्द्रण		
			औद्योगिक, रिहायशी, ग्रामीण और अन्य क्षेत्र	पारिस्थितिकी य संवेदनशील क्षेत्र (केन्द्र सरकार द्वारा अधिसूचित)	प्रवोधन की पद्धति
(1)	(2)	(3)	(4)	(5)	(6)
1	सल्फर डाई आक्साइड (SO_2), $\mu g/m^3$	वार्षिक*	50	20	-उन्नत वेस्ट और गाईक
		24 घंटे**	80	80	-पत्रवैगनी परिदीप्ती
2	नाइट्रोजन डाई आक्साइड (NO_2), $\mu g/m^3$	वार्षिक*	40	30	-उपांतरित जैकब और हॉवाइजर (सोडियम-आर्सेनाईट)
		24 घंटे**	80	80	-रसायनिक संदीप्ति
3	विविक्त पदार्थ (10माइक्रान से कम आकार)या PM_{10}, $\mu g/m^3$	वार्षिक*	60	60	-हरात्मीक विश्लेषण
		24 घंटे**	100	100	-टेपेम
					-बीटा तनुकरण पद्धति

4	विविक्त पदार्थ (2.5 माइक्रान से कम आकार या $PM_{2.5}$, $\mu g/m^3$	वार्षिक* 24 घंटे**	40 60	40 60	-ह्रासात्मक विश्लेषण -टोयम -बीटा तनुकरण पद्धति
5	ओजोन (O_3) $\mu g/m^3$	8 घंटे** 1 घंटा**	100 180	100 180	-पराबैगनी द्वीप्तिकाल -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 -टेफलॉन 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 सतत् 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 स्पैक्ट्रामिती 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 किये 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, उक्त 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

[विज्ञापन-III/4/184/09/असा.]

टिप्पणी: राष्ट्रीय परिवेशी वायु गुणवत्ता मानक संबंधी अधिसूचनाएँ, केन्द्रीय प्रदूषण नियंत्रण बोर्ड द्वारा भारत के राजपत्र असाधरण 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 ।

(1)	(2)	(3)	(4)	(5)	(6)
9	Benzene (C_6H_6) $\mu g/m^3$	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.

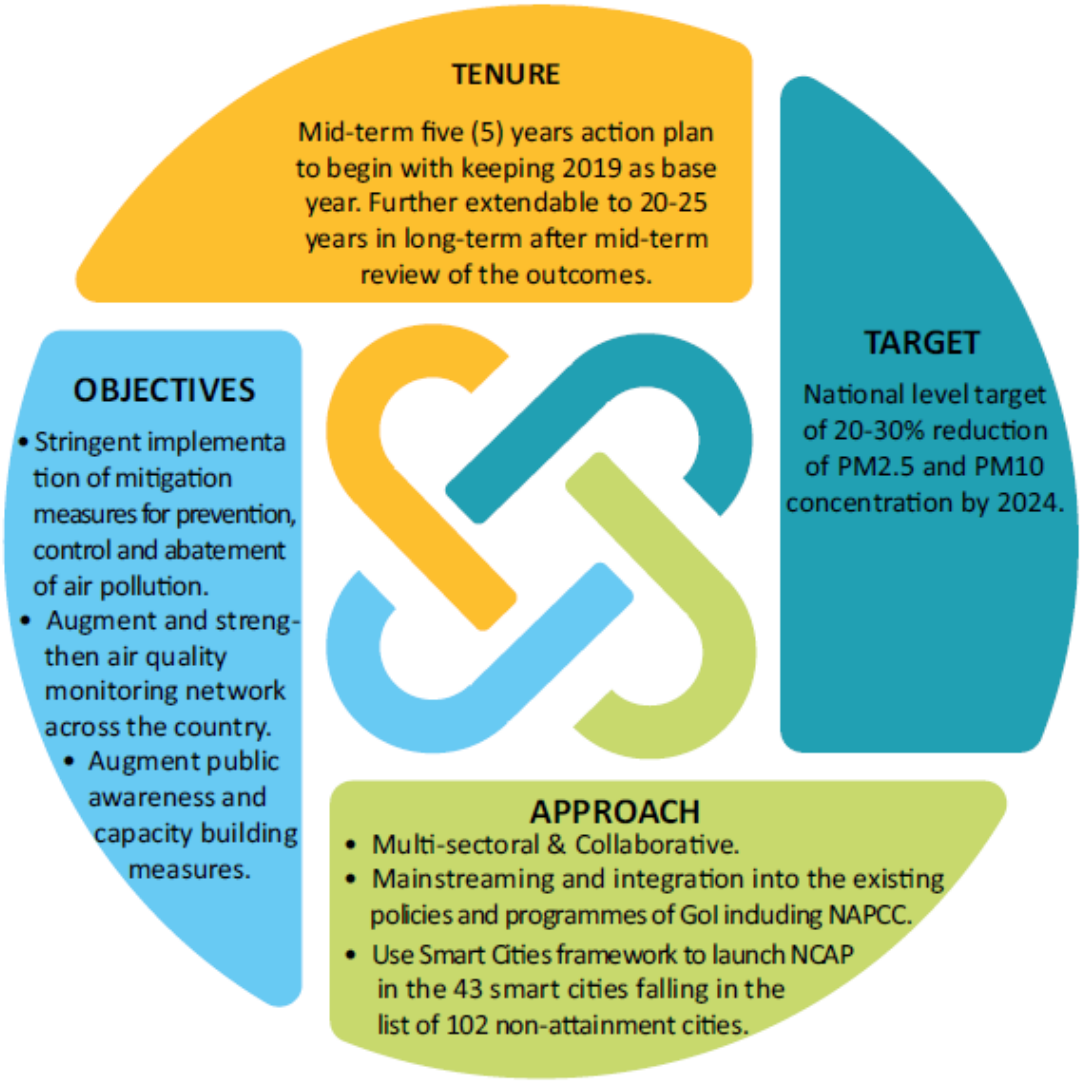
Note. — Whenever and wherever monitoring results on two consecutive days of monitoring exceed the limits specified above for the respective category, it shall be considered adequate reason to institute regular or continuous monitoring and further investigation.

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.

Printed by the Manager, Government of India Press, Ring Road, Mayapuri, New Delhi-110064
and Published by the Controller of Publications, Delhi-110054.

	$\mu g/m^3$	24 hours**	400	400	-Indophenol blue method



Maharashtra Pollution Control Board
महाराष्ट्र प्रदूषण नियंत्रण मंडळ

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