STUDY ON AMBIENT AIR QUALITY LEVEL AT DIFFERENT LOCATIONS INSIDE LATUR CITY

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Abstract : Maharashtra Pollution Control Board, Mumbai recently declared that there are seventeen cities are polluted in a state for air quality, Latur city is one of them. There are three air monitoring stations allocated in different areas of Latur, by Maharashtra Pollution Control Board under the guideline of Central Pollution Control Board, Delhi, which are in Residential area at Shayam nagar, Commercial area at Ganjgolai and Industrial area at MIDC water supply tank. The air quality status analyzed on based of four parameters NOx, SO_2, RSPM and SPM. This paper presents one-year study of these parameter from **January 2017 to December 2017**, for every weak, two days on each monitoring stations mean 48 hours continuously by Respairable dust sampler machine which is calibrated by Envirotech new Delhi. After one year study of these parameters, the result found that the values of Respairable suspended particulate matter are very much more than standard value prescribed by CPCB in the Commercial area and Residential area but it is found that lower values in Industrial area as compare to Residential and Commercial area and also it was observed that the value of Nox and SO_2 below the permissible limit prescribed by CPCB.

Keywords- Ambient air quality, CPCB,SPM, RSPM,NO_x,SO_2,

I. INTRODUCTION

Ambient Air Quality condition of Latur city progressively deteriorated because of bad road conditions, poor maintains of vehicles, burning of dry grass, wood,coals,constructions, activities of transportation of air pollutants, for good health need good quality air for all existing life in atmosphere . Due to air Pollution, the adverse effect on human health like shortness of breath, nausea, sore throat, sneezing. Irregular transportations and poor roads, combustion of wastes, constructions are major source of Latur city to create ambient air pollution.

II. MATERIALS AND METHODS

Latur city is famous for international trade, Education hub, small scale Industries, Production of Tur dal and Edible oils. Total area of the city is 32.56 Km^2 and elevation 515 meters,population 3.83 lacs, temperature range from 13 to 41^{0}C the highest temperature is recorded 45^{0}C and lowest is 6.9^{0}C the monsoon occurs in month of June to September. Three monitoring Stations located at Shayam Nagar- Residential area, Ganjgolai- Commercial area, Water supply Tank- Industrial area Study has completed during for the month of **January 2017 to December 2017**. Under the National Ambient Air Quality Monitoring Project, sponsored by MPCB Mumbai and CPCB New Delhi, and run by Dayanand Education Society's Dayanand Science College, Latur, Dept. of Industrial Chemistry since May 2008.Measurement for SO_2 and NO_xSample monitoring through Thermo electrically cooled gaseous sampling attachment to RDS machine which is made by Envirotech. Frequency of Sample collection for everyFour hours duration, machine works for two days at each site in week .SO_2 and NO_x are collected in suitable absorbing reagent. These samples are analyzed by spectrophotometrically Systronics spectrophotometer 166, and method usedfor analysis was West &Geake for SO_2 and Jacob & Hochheiser method for $NO_x$and RSPM,SPMMonitored Sample collection and data analysis was carried out by using a commercially available Respairable dust sampler (RDS-Envirotech APM 411TE model). Usually the air was drawn at a flow rate of 1.1 m^3per minute. The air inside the sampler passed through a combination of cyclone separator and filter in two stages. At the first stage, the cyclone separator was used to collect the bigger particles (particles in the size range of 10 to 100 µg).The rest of the particulates in the size range of 2.5 to 10µgm were collected over previously dried and weighed glass micro fiber filters (Whatman GF/A,203*254 mm).RDS was operated continuously for two days. However, filter paper and cyclone cup were replaced at interval of eight hours as per central pollution control board norms and conditions. Thus, the collection inside the container attached with the cyclone separator could give the mass of PM_{10-100} and the collection over the filter paper could represent the mass of PM_{10} (RSPM)). The loaded and unloaded filters were weighed after conditioning them in desiccators and oven. Finally, the SPM concentration was calculated.

Table1. Monthly average concentration of RSPM (PM_{10}) in µg/m^3 at three location

Month	Residential area	Commercial area	Industrial area
January	129.3	80	127
February	118.3	70	126
March	100	71	115
April	98	111	119
May	74.7	94	81
June	47	57	42
July	54	53	43
August	73.8	44	69
September	53	43	64
October	92	51	66
November	87.2	85	76
December	98	93	100

Table2. Monthly average concentration of SPM in µg/m^3 at three loction

Month	Residential area	Commercial area	Industrial area
January	283.6	223.8	325.3
February	320.8	264.8	313.6
March	268.2	233.8	302.8
April	248.5	264	310.1
May	207.0	301.6	240.4
June	135.8	189.1	119.3
July	187	186.7	99.5
August	136.8	169	137.2
September	121	112.7	127
October	161.4	121.3	132.9
November	211.6	211.7	209.7
December	277.6	255.1	254.2

Table3. Monthly average concentration of SO_2 in µg/m^3 at three location

Month	Residential area	Commercial area	Industrial area
January	5	6	5
February	5	6	5.3
March	4.8	5	5
April	6.1	6	6
May	5.6	6	6
June	4.7	5	5
July	4.8	5	5
August	5	5	5
September	5	4.8	5
October	6	6.2	6
November	6.2	6.4	6.4
December	5.5	5	5.2

Table4. Monthly average concentration of NO_xµg/m^3 at three location

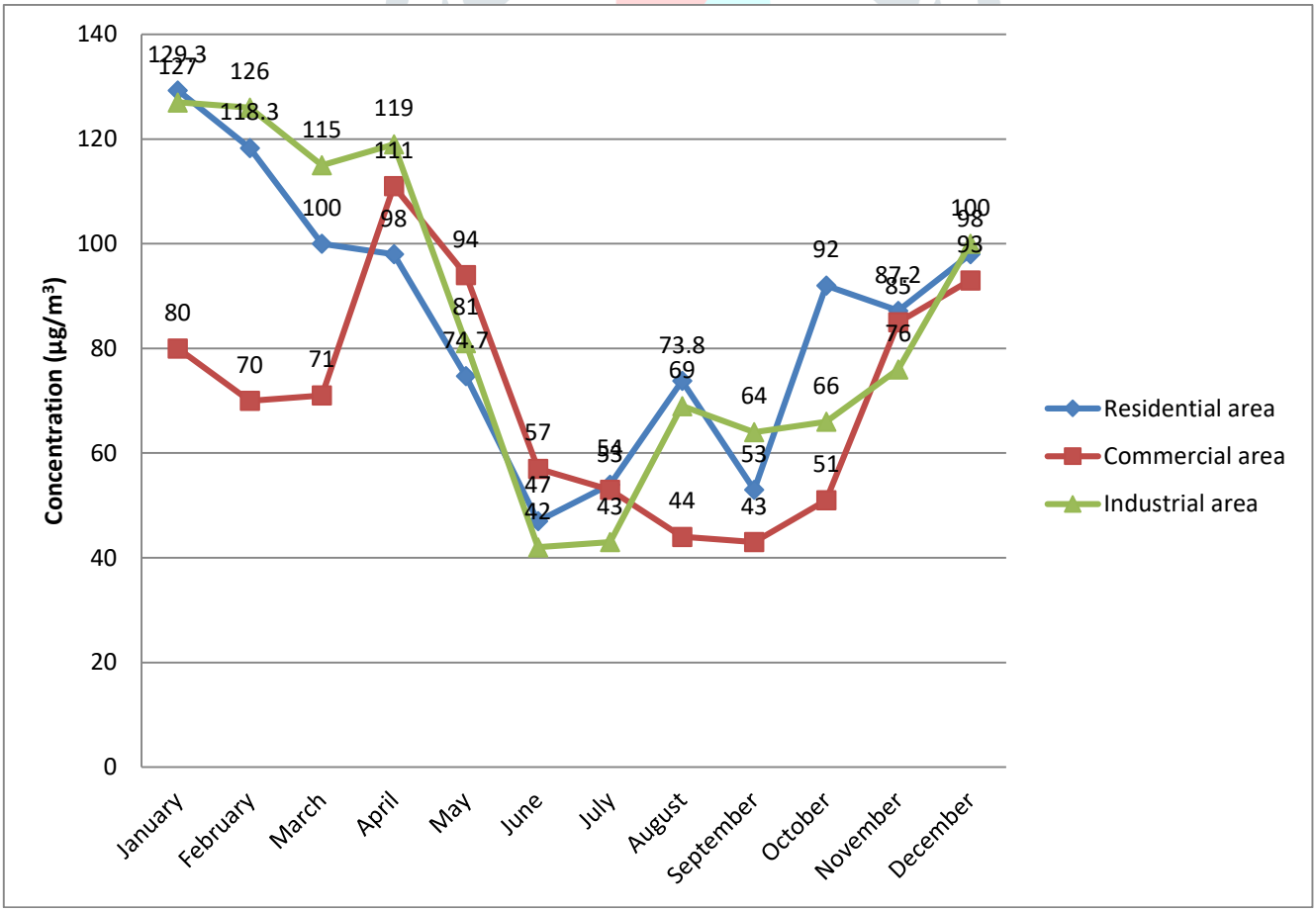
Month	Residential area	Commercial area	Industrial area
January	17.9	18	18
February	20.2	22	19.8
March	21	22	22
April	19.6	20	19
May	19.1	19	19
June	17	17	16
July	17.4	17.6	16
August	19.9	19.7	19
September	19.5	19.5	19.2
October	22.8	24.5	24
November	21.5	21.6	21
December	22.2	22	21.6

Table5. Average concentration(µg/m^3) of different pollutants for yearly at three sites

Sampling sites	RSPM	SPM	SO_2	NO_x
Residential	76.52	215.9	5.30	19.84
Commercial	71	211.13	5.53	20.24
Industrial	85.66	214.33	5.40	19.55

Table6. National ambient air quality standards (Annual) for different parameters in (µg/m^3)

Sampling sites	RSPM	SPM	SO_2	NO_x
Residential	60	140	60	60
Commercial	60	140	60	60
Industrial	120	360	80	80



- **Fig.1 – Showing monthly average concentration of RSPM (µg/m^3) at Residential, Commercial, and Industrial area.**

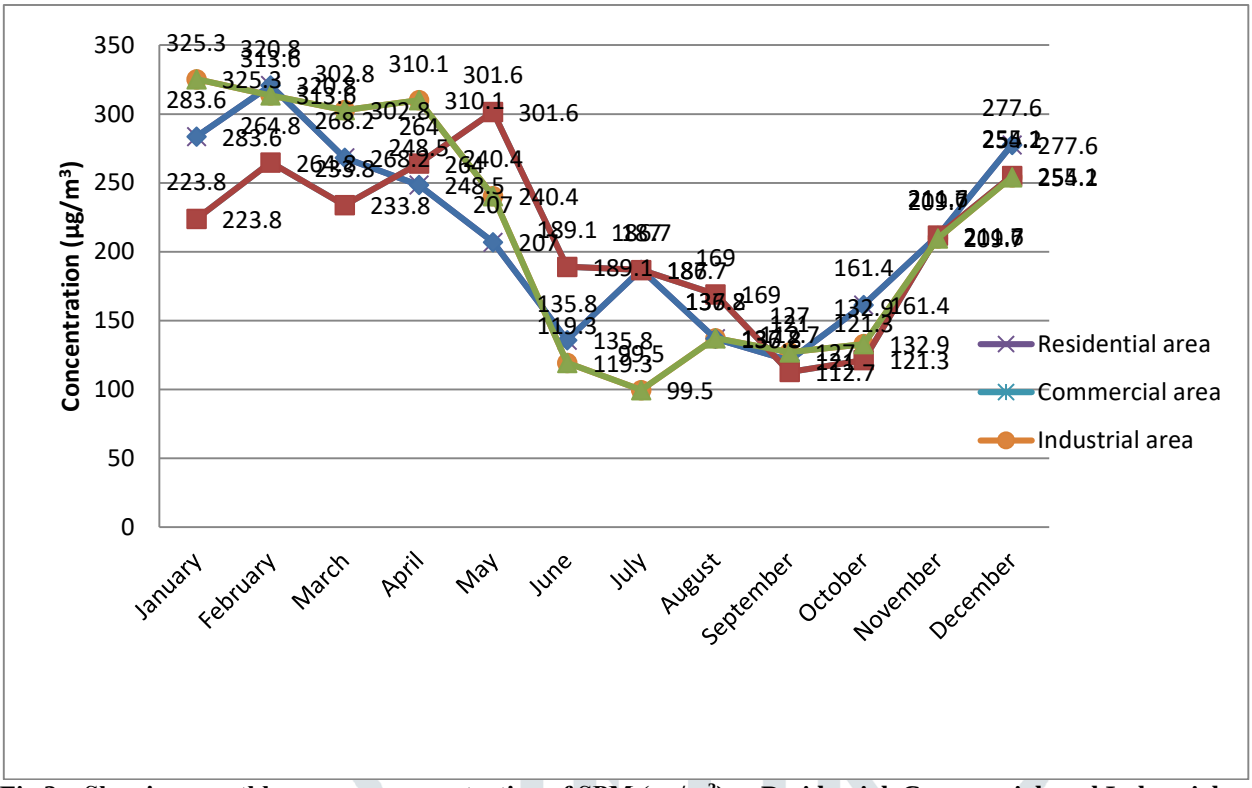


Fig.2 – Showing monthly average concentration of SPM (µg/m^3) at Residential, Commercial, and Industrial area.

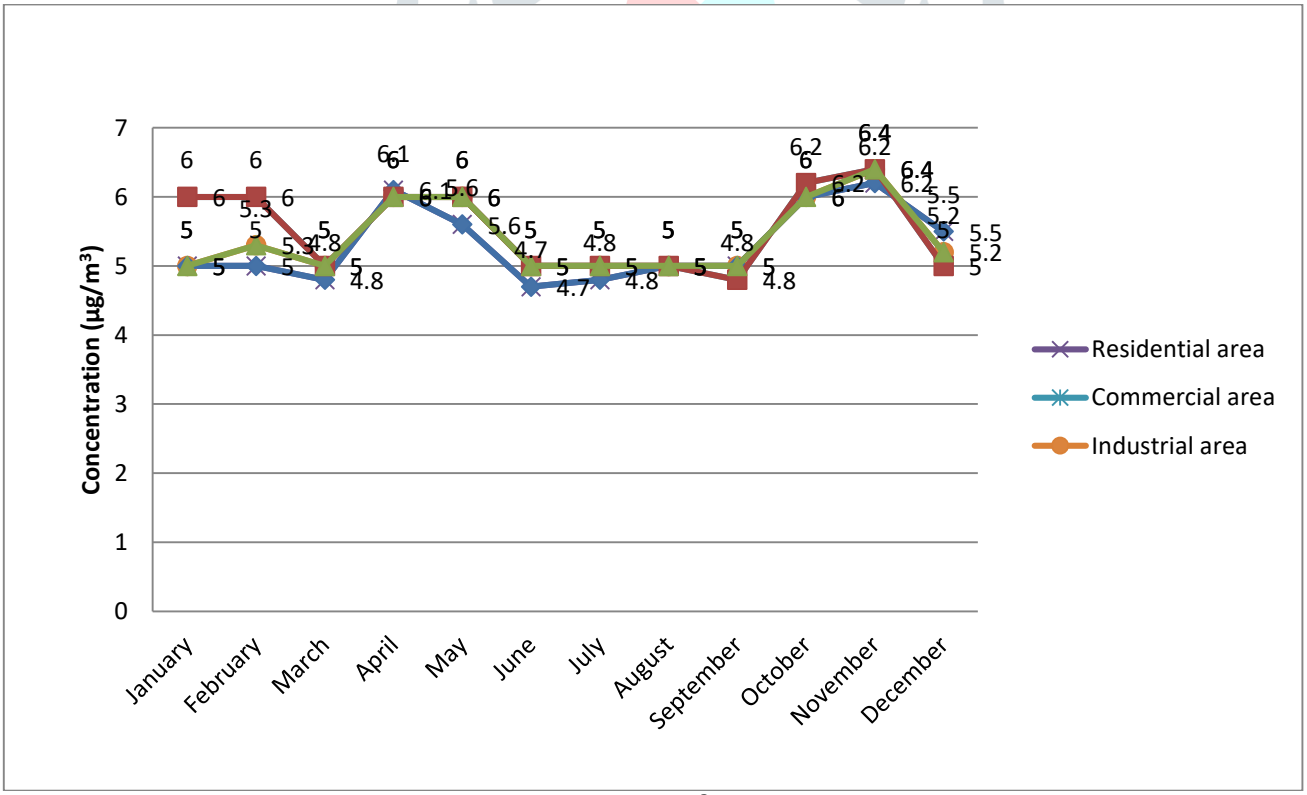


Fig.3 – Showing monthly average concentration of SO2 (µg/m^3) at Residential, Commercial, and Industrial area

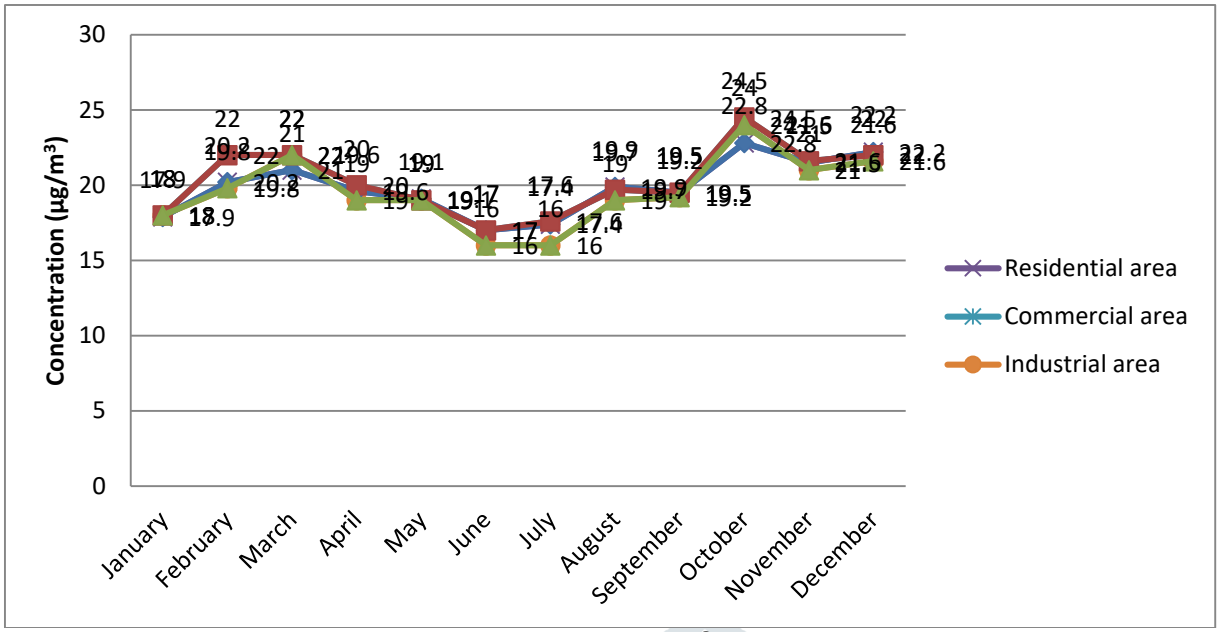


Fig.4 – Showing monthly average concentration of Nox (µg/m^3) at Residential, Commercial, and Industrial area

III. RESULTS AND DISCUTION

The results of RSPM for three different locations have been presented in table 1.It was observed lower value of RSPM concentration was 47µg/m^{3}and higher was 129.3µg/m^3 at residential area. Lower value of RSPM concentration was 43µg/m^{3}and higher was 111µg/m^{3}at commercial area. Lower value of RSPM concentration was 42µg/m^{3}and higher was 127µg/m^{3}at industrial area. Annual average of RSPM concentration was 76.52µg/m^3,71.00µg/m^3,85.66µg/m^{3}at Residential, Commercial and Industrial areas respectively. From table 2. Lower value of SPM concentration was 121µg/m^3 and higher was 320.8µg/m^3 at residential area. Minimum value of SPM concentration was 112.7µg/m^{3}and maximum was 301.6µg/m^{3}at commercial area. Lower value of SPM concentration was 99.5µg/m^3 and higher was 325.3µg/m^3 at industrial area. Averages concentration SPM was 215.9µg/m^3,211.13µg/m^3 and 214.33µg/m^3 at residential, commercial and Industrial areas respectively. It was noticed that annual average concentration of RSPM and SPM at Residential as well as Commercial areas are more than the National ambient air quality standards, because of under construction roads, school ground is near to Residential location also short width roads, traffic density, garbage shop near commercial area. And it may be largely due to transportation activity. Seasonal variations are also found at all sites. During the month of January to April it is maximum in Latur city and month of June to September it is found lower and in the month of October to December it is again increases the concentration of SPM, RSPM,SO_2 and NO_x at Residential and Commercial area. The reason may be increased October festival activity and in the industrial area there is not found any Chemical Industries so result of RSPM and SPM are below the permissible limit of CPCB. The results of Sulfur dioxide and Oxides of Nitrogen for all three locations are normal in range which is shown in Table 3 and 4. But they were slightly increasing in month of Dipawali festival.

IV. CONCLUSION

In this investigation the average concentration of SO_2 and NO_x shows bellowing the permissible limit as per CPCB standards forall three monitoring stations and the annual Average of RSPM and SPM concentrations shows a variation and higher in residential, commercial areas. Due to general transportation, automobiles, small-scale industries and elevated rate of combustion of convectional fuels are found to be the source of particulate pollutant in Latur city.

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