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Effect of Air Quality Parameters in Hyderabad and Mapping Using QGIS and Detection Management Software

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Abstract*: *This paper mainly focuses on determination of particulate matter (PM), carbon dioxide and Carbon monoxide, relative humidity (RH), temperature, volatile organic compounds (VOC) and dew point in eleven most polluted areas in Hyderabad using equipment (3MTM EVM series) environmental monitor. In this paper we represented above parameters in the form of graph using Detection Management software in the duration of readings taken in a day and also we have done mapping using QGIS software.

Keywords* : *Environmental monitor, Detection management software, QGIS mapping, pollution contaminants.

I. INTRODUCTION ON ENVIRONMENTAL MONITOR (EVM)

The EVM is able to carry or move as instrument is light weight with a laser-photometer that measures various toxic gases, dust, any type of matter related to pollution [1-3]. The below equipment uses modern technology which measures up to three gases simultaneously in a selection of various toxic gases, volatile compounds, pollutants [4-7].

Fig 1 EVM keypad and display

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II. OBJECTIVES

• Determination of particulate matter(PM), CO2, CO, Humidity, presence of temperature, volatile organic compounds (VOC) and dew point in eleven most polluted areas in Hyderabad using equipment (3MTM EVM 7 series) environmental monitor.
• Analyzing and Representation of above parameters in the form of graph using DETECTION MANAGEMENT software.
• Mapping this Data using QGIS software.

A. Significance

• To Measure several air pollutants or toxic gases including 10 microns and smaller particulate sizes which is harmful to human being will be obtained from this studies.
• Measuring humidity which reduces the in festivity of aerosolized influenza virus.
• Finding carbon monoxide which is responsible for heart disease, anemia and breathing problems.
• Measuring Volatile compounds as its vulnerability leads to major health issues like visual impairments, memory loss.
• Presence of moisture mixed with dust particles will be detected from these studies.
• Locating levels of Relative humidity.

III. EXPERIMENTAL STUDY

Total Eleven areas were chosen for experimental studies which are majorly involved in pollution contaminants [8-11]. The reasons for the selected areas are listed below:

1. In Miyapur Y-junction, petrol bunk and bus stop are very near, so more rush is present which cause more pollution.
2. More software companies present in Kondapur and Jubilee Hills, so more traffic present in that area.
3. In Erragadaa and Koti where more rush is present because of vehicles and public, potential area to cause more suffocation damage to health due to pollutants.
4. Secunderabad railway station, JNTUH and Shilparamam where more rush is present because of public and vehicles.
5. Uppal and Begumpet out skirts of the city where fluctuation in pollutant concentration is less.
6. L.B Nagar is suffocated area and more traffic area which cause pollution.

IV. MAPPING POLLUTION CONTAMINANTS DATA IN DIFFERENT AREAS USING QGIS SOFTWARE

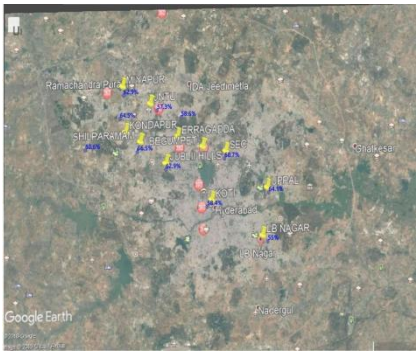

Fig 4.1 Humidity data at different areas in Hyderabad

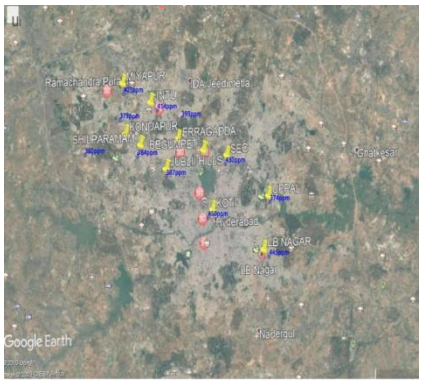

Fig 4.2 Co2 data at different areas in Hyderabad

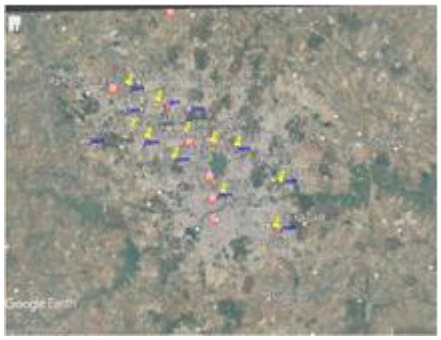

Fig 4.3 CO data at different areas in Hyderabad

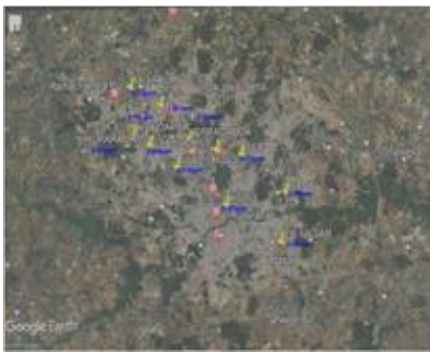

Fig 4.4 PM data at different area in Hyderabad

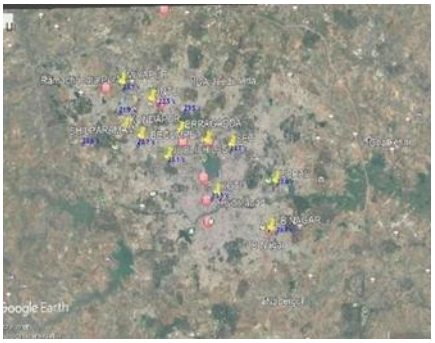

Fig 4.1.5 Dew point at different areas at Hyderabad

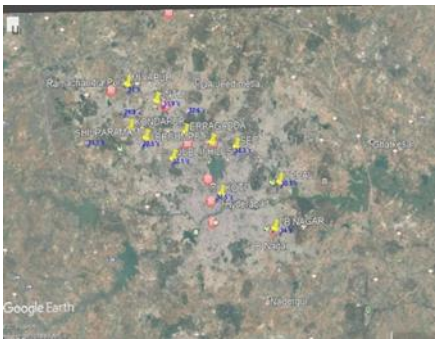

Fig 4.1.6 temperature data at different areas

A. *Graphical Representation of analysis using Detection Management Software*

MIYAPUR

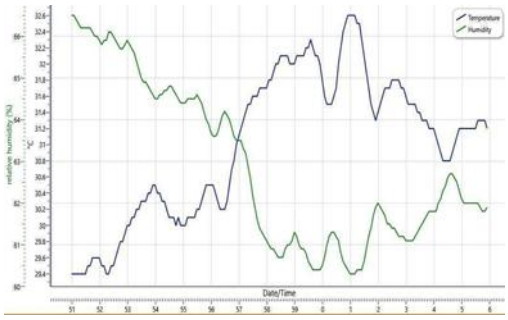

Fig 4.1 Humidity and Temperature

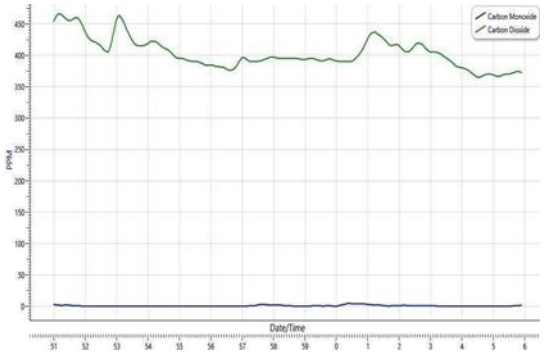

Fig 4.2 Carbon monoxide and Carbon dioxide

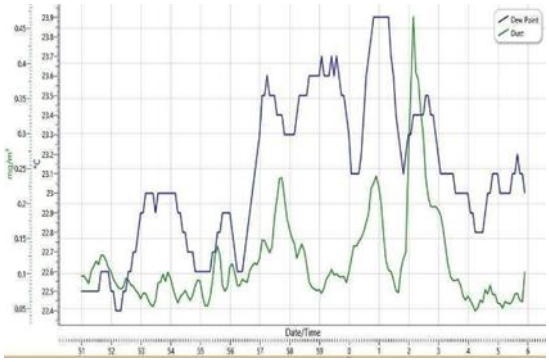

Fig 4.3 Dust, Dew point

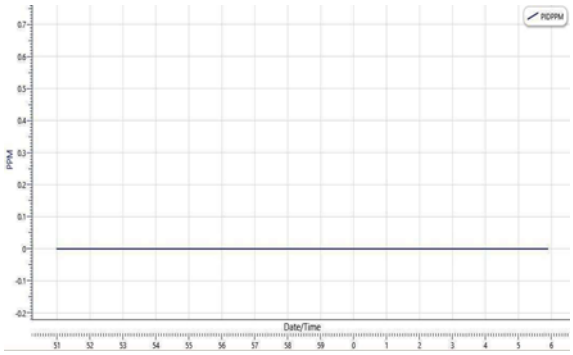

Fig 4.4 PID (volatile compounds)

KONDAPUR

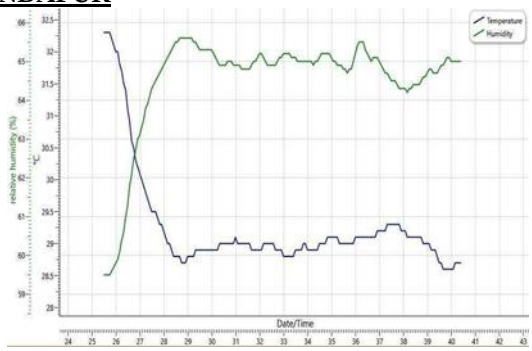

Fig 4.5 Humidity and Temperature

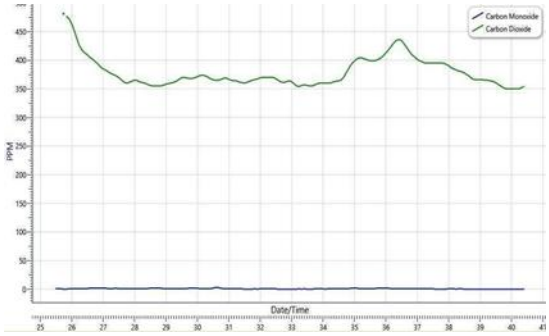

Fig 4. 6 Carbon monoxide and Carbon dioxide

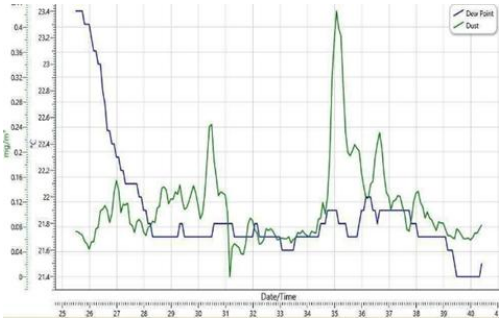

Fig 4.7 Dust and Dew point

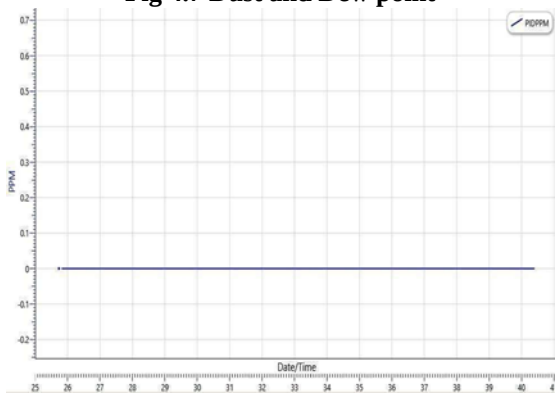

Fig 4. 8 PID (volatile compounds)

SHILPARAMAM

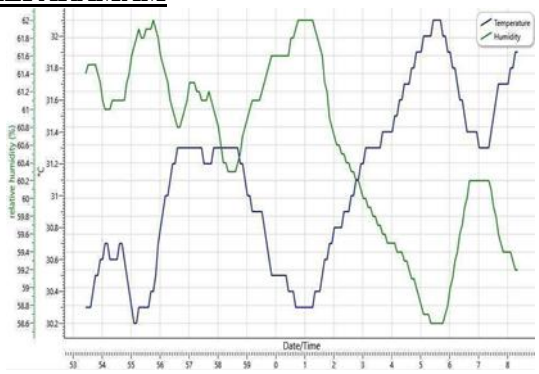

Fig 4.9 Humidity and Temperature

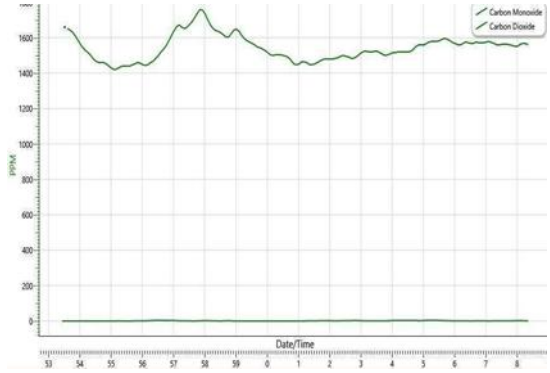

Fig 4.10 CO and Carbon dioxide

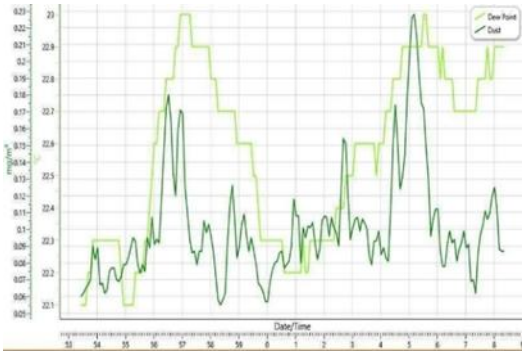

Fig 4.11 Dust and Dew point

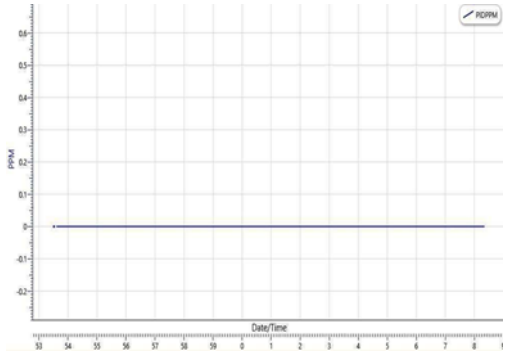

Fig 4.12 PID (volatile compounds)

JUBLIEE HILLS

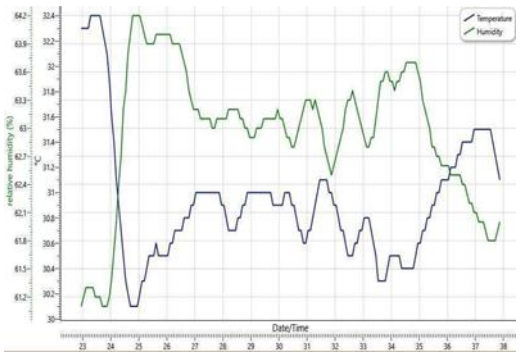

Fig 4.13 Humidity and Temperature

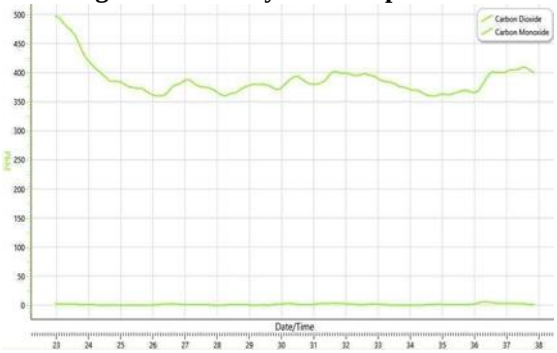

Fig 4.14 CO and Carbon dioxide

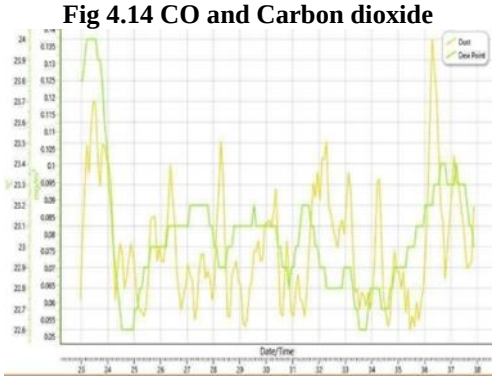

Fig 4.15 Dust and Dew point

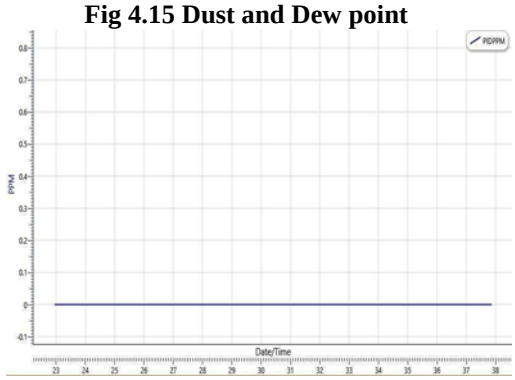

Fig 4.16 PID (volatile compounds)

ERRAGADDA

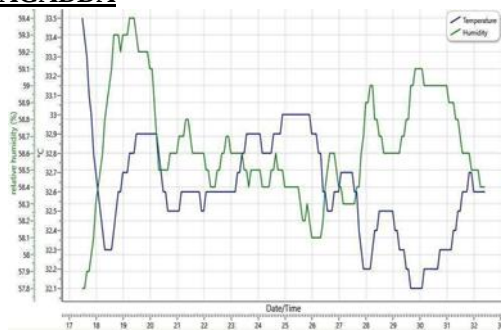

Fig 4.17 Humidity and Temperature

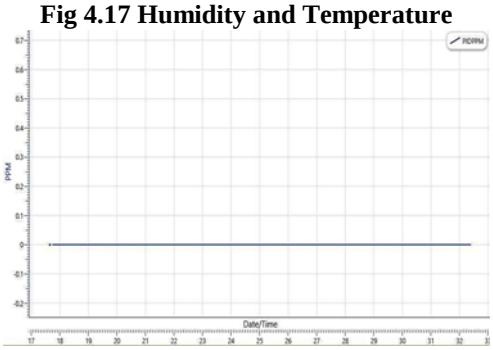

Fig 4.18 PID (volatile compounds)

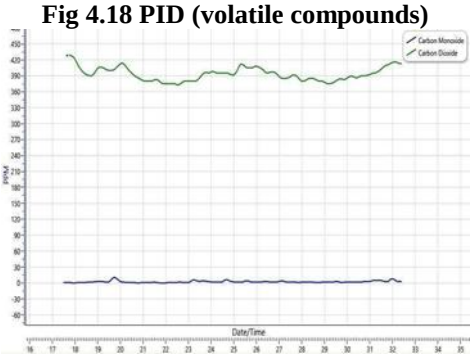

Fig 4.19 carbon monoxide and carbon dioxide

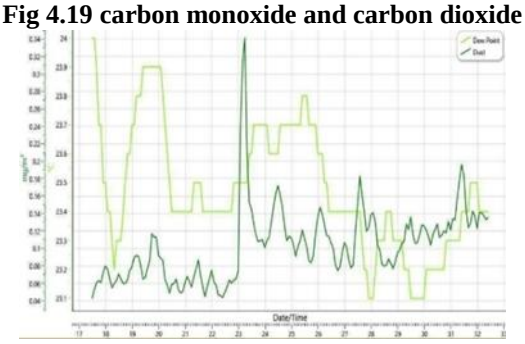

Fig 4.20 Dust and Dew point

JNTUH

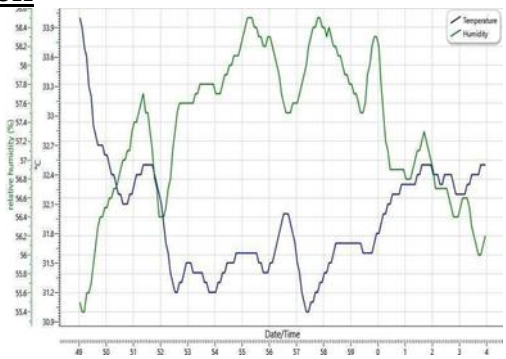

Fig 4.21 Humidity and Temperature

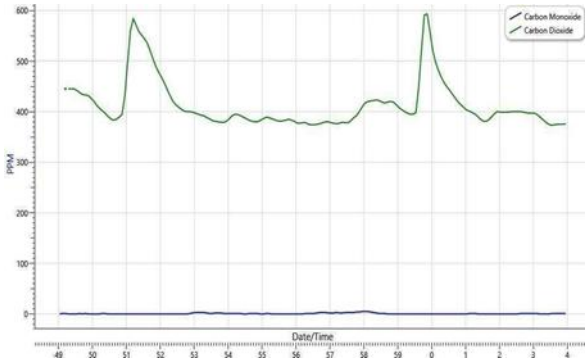

Fig 4.22 CO and Carbon dioxide

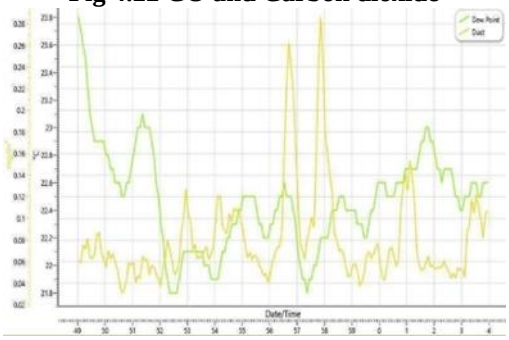

Fig 4.23 Dust and Dew point

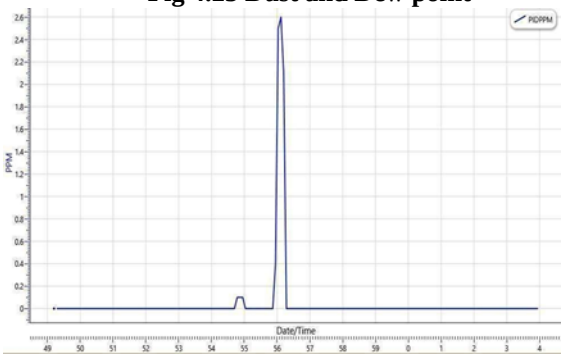

Fig 4.24 PID (volatile compounds)

SECUNDARABAD

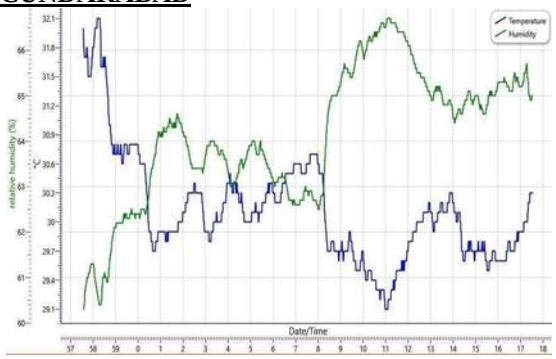

Fig 4.25 Humidity and Temperature

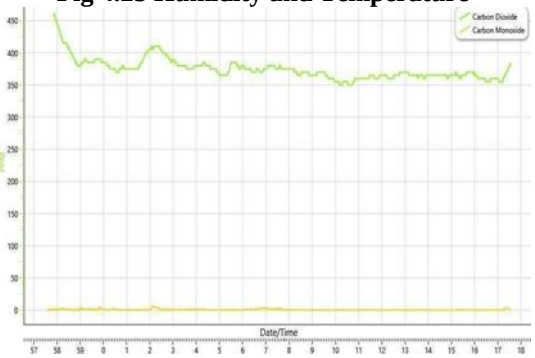

Fig 4.26 CO and Carbon dioxide

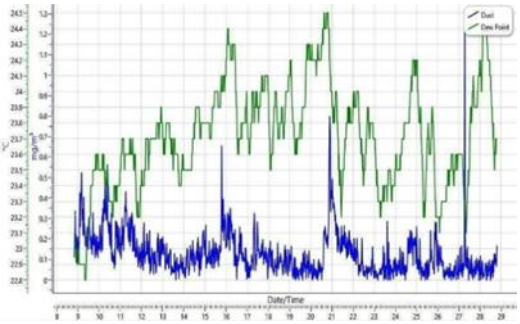

Fig 4.27 Dust and Dew point

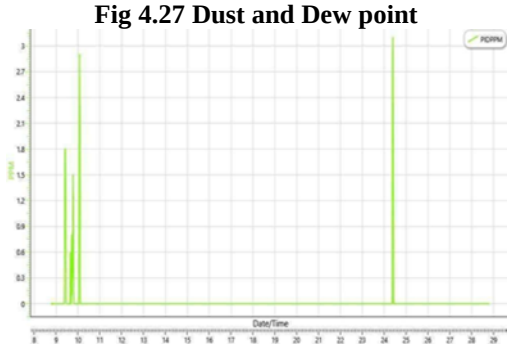

Fig 4.28 PID (volatile compounds)

UPPAL

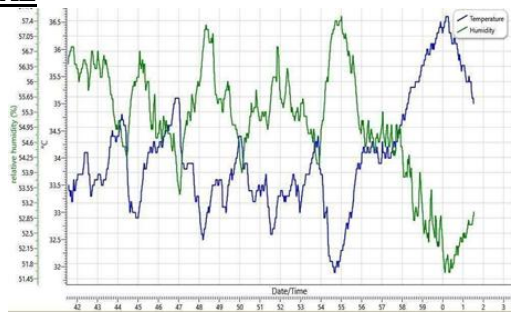

Fig 4.29 Humidity and Temperature

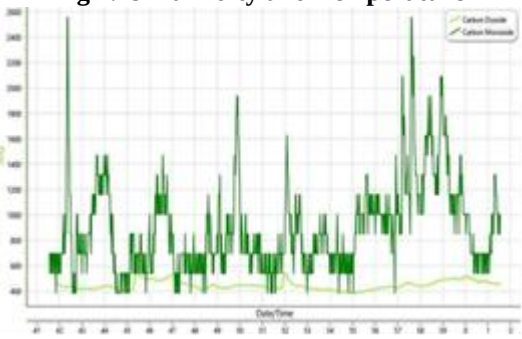

Fig 4.30 CO and Carbon dioxide

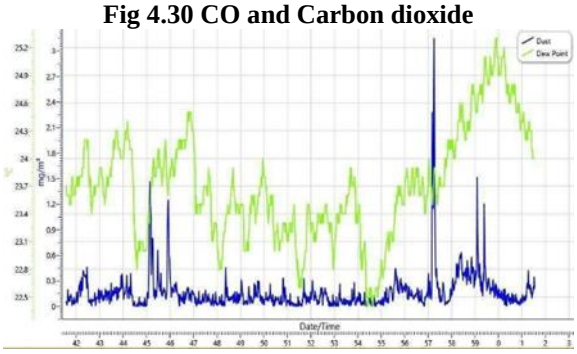

Fig 4.31 Dust and Dew point

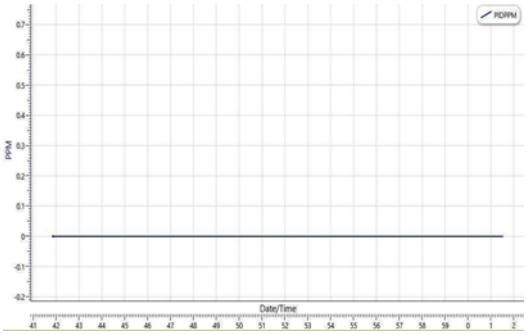

Fig 4.32 PID (volatile compounds)

L B NAGAR

Fig 4.33 Humidity and Temperature

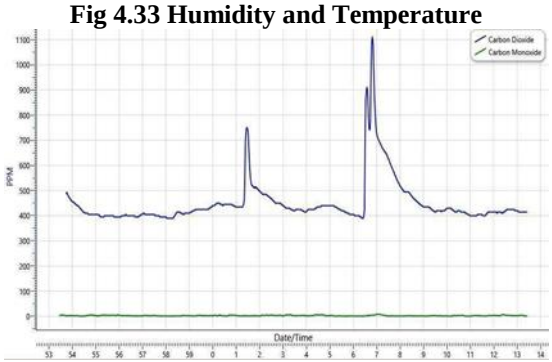

Fig 4.34 CO and Carbon dioxide

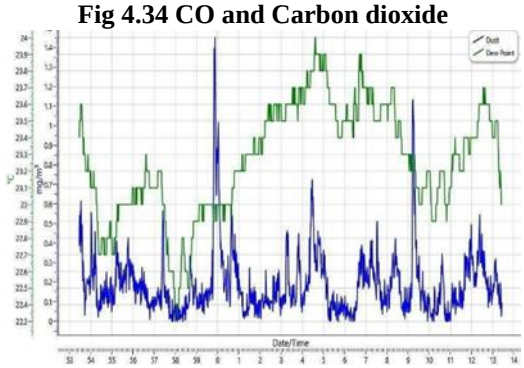

Fig 4.35 Dust and Dew point

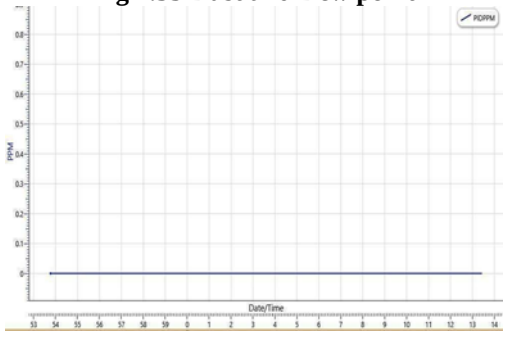

Fig 4.36 PID (volatile compounds)

KOTI

Fig 4.37 Humidity and Temperature

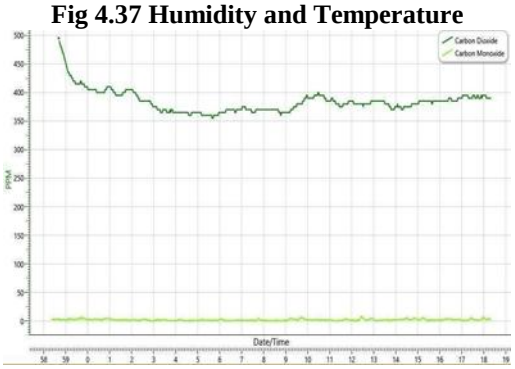

Fig 4.38 CO and Carbon dioxide

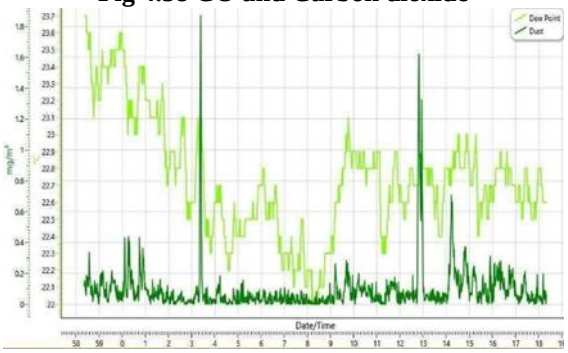

Fig 4.39 Dust and Dew point

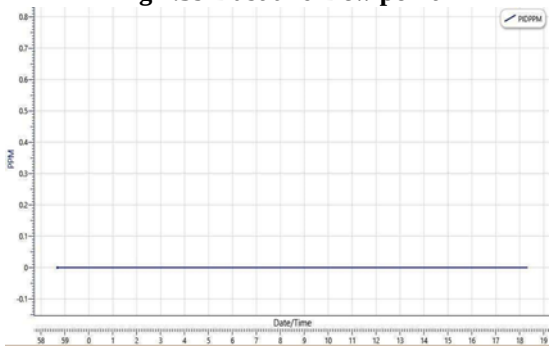

Fig 4.40 PID (volatile compounds)

BEGUMPET

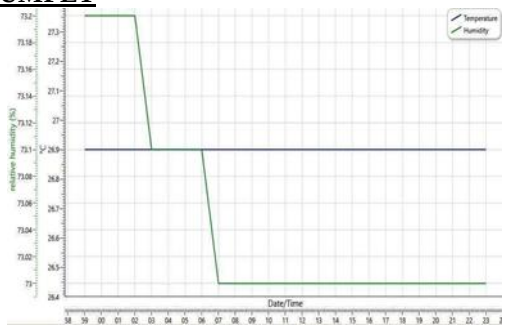

Fig 4.41 Humidity and Temperature

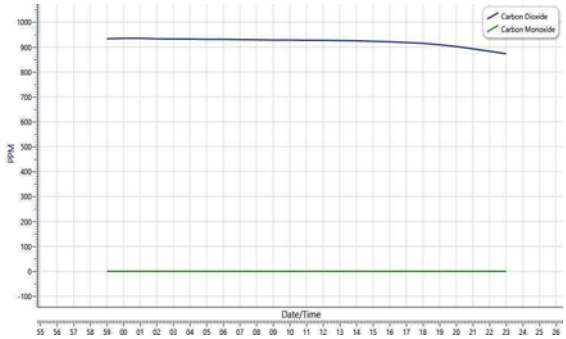

Fig 4.42 CO and Carbon dioxide

B. *DISCUSSIONS*

1. Particulate matter in some areas extremely high compare to other areas and in some areas within the range [10-13]. As per Air quality standard Particulate matter should not exceed 0.1 PPM

2. The levels of carbon monoxide are in measurable range. As per the standards, maximum limit of CO concentration in air is 0.2 PPM which doesn't harm human beings.

3. Volatile compounds in all areas are under range except in JNTUH.

4. Fluctuates in temperature is slightly high in some areas it is stable in outskirt like Begumpet. Measurable temperature is 35 0C to 42 0C

5. Dew point almost within the range in all measured areas.

6. Humidity level are high in some areas and in some areas it is stable measurable range 25% to 60%

7. Carbon dioxide levels is almost same in all areas only slight fluctuations compare to one area toanother.CO2 range is 350 to 450PPM.

V. CONCLUSIONS

The following conclusions are drawn indicating highest in two areas and least among all of seven parameters which are listed below:

1. Particulate matter found high in L.B. Nagar (3.145PPM) followed by Begumpet (1.869PPM) and least in Jubilee hills (0.137PPM).

2. Carbon monoxide found high in L B Nagar (14PPM) followed by Erragada (11PPM) and least in Shilparamam (4PPM).

3. Carbondioxide found high in Koti (1110PPM) followed by Secunderabad (615PPM) and least in Erragadda (429PPM).

4. Volatile compounds is high in Secunderabad (3.10PPM) followed by JNTUH (2.60PPM) and ZERO in remaining areas.

5. We found remaining parameters like temperature, humidity and dew point nearly same in almost all areas.

6. From above we conclude slightly high fluctuations almost in all areas except in Begumpet as we got stable readings.

VI. SUGGESTION BASED ON PRESENT WORK

1. Electrostatic precipitators, renewable energy, alternative energy and using respiratory masks in highly polluted and traffic areas usages are very important to prevent emission of particulate matters in the environment.

2. Many preventive measures are to be carefully studied and make them habituate with available knowledge by considering the differences in pollutant mixtures, concentration levels, exposure patterns, and various underlying population characteristics.

3. Government of India has taken several prevention measures like banning old vehicles more than 15 years, using battery vehicles. Apart from this, Government has to implement laws for preventing increased pollution and emission standard.

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