Status of National Ambient Air Quality of Mysuru City, Karnataka

CENTRAL POLLUTION CONTROL BOARD
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1. ABOUT MYSURU CITY

State	Karnataka
Location	12.26°00″N 76.6°00″ E
Area	128.42 Sq.km with 65 municipal wards
Elevation	763 m (2,503 ft)
Population	Around 12 lakhs with 2, 00,000 floating population every day and 50000-60000 foreign tourists annually.
Climate	Mysuru is located in the southern part of the Deccan Plateau. The climate of Mysuru is moderate throughout the year. The weather in winter is cool and the summers are bearable. The minimum temperature in winter is around 15 degrees Celsius and in summer the maximum temperature is around 35 degrees Celsius. Mysuru gets most of its rains during the monsoon between June to September. Annual average rainfall is around 86 centimeters.
Geography	Located on the Deccan Plateau in the south-eastern part of Karnataka. The types of soil found in this district are red soils (red gravelly loam soil, red loam soil, red gravelly clay soil, red clay soil), lateritic soil, deep black soil, and brown forest soil.
Industries	Pharmaceuticals, Textiles , sugar, Software Development , Tobacco Processing, Food Products, Printing, DTP, BPO
Air Quality Stations	02 (Industrial and Residential, Commercial and Residential)
Location of Mysuru City	

2. DETAILS OF NAMP STATIONS

The Mysuru city has two NAMP stations and it is maintained and regularly monitored by Mysuru city Regional Office, Karnataka SPCB. One station is located at Terrance of Mysuru KSPCB building (SC - 328) covering Residential and Industrial areas. Another Station is located at Terrance of KSRTC Building, KR Circle (SC – 040) covering Residential and commercial areas. The monitoring of these stations is carried out by Mysuru Regional Office, Karnataka SPCB, 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. The parameters monitored are Sulphur dioxide (SO_2), Nitrogen dioxide (NO_2), Particulate Matter (PM_{10}), Ammonia (NH_3) and Lead (Pb). The figure below shows the NAMP stations located in Mysuru city.

Fig no. 1: NAMP Station located in KSPCB Building terrace (SC -328) – Residential & Industrial area

Fig No. 2: NAMP Station located in KSRTC Building, KR Circle (SC -040) - Commercial & Traffic Intersection

3. DATA FOR AQI CALCULATION

The Mysuru Regional Office, KSPCB on request has sent the NAMP stations data for the month of August and September, 2015 for both the stations. This data has been used in preparing the AQI for those stations. The parameters monitored at these stations are Sulphur dioxide (SO_2), Nitrogen dioxide (NO_2), Particulate Matter (PM_{10}), Ammonia (NH_3) and Lead (Pb). However to start with only three parameters such as Sulphur dioxide (SO_2), Nitrogen dioxide (NO_2) and Particulate Matter (PM_{10}) are considered for calculation of AQI.

4. CALCULATION OF AQI

The AQI is calculated as following:

- The data received from the KSPCB was in 4 – hourly concentration for SO_2 and NO_2 and 8 – hourly for PM_{10} parameters. It was converted into 24-hourly average concentration.

- The Sub-indices for individual pollutants were calculated using its 24-hourly average concentration value and health breakpoint concentration range.

- The formula used for calculation of Sub-indices is:

  $Ip = [\{(IHI - ILO)/ (BHI - BLO)\} * (Cp - BLO)] + ILO$

  Where
  BHI = Breakpoint concentration greater or equal to given concentration
  BLO = Breakpoint concentration smaller or equal to given concentration
  IHI = AQI value corresponding to BHI
  ILO = AQI value corresponding to BLO; subtract one from ILO, if ILO is greater than 50

  AQI = Max (Ip) (where; p= 1,2,...,n); denotes n pollutants

- The NAMP data received from the KSPCB was fed into the AQI calculator prepared in the Microsoft Excel sheet and the value of Sub-indices and AQI was calculated.

5. RESULT

Since manual stations measure PM_{10}, it was suggested that for manual station AQI for past days can be calculated as long as PM_{10} or $PM_{2.5}$ is measured. It was proposed that for manual station, AQI is reported for at least three parameters and one of them should be PM_{10} or $PM_{2.5}$ possibly on a week basis.

AQI has been calculated for the month of August and September, 2015 for monitoring stations KSPCB Building terrace (SC -328) and KSRTC Building, KR Circle (SC -040).

KSPCB Building terrace (SC -328) for the month of August, 2015

AIR QUALITY INDEX (AQI)					
SUB INDEX				AQI	
Date/Month/Year	NO_2	SO_2	PM_{10}		
3/8/2015	26	13	25	26	GOOD
6/8/2015	26	13	63	63	SATISFACTORY
10/8/2015	28	14	29	29	GOOD
13/8/2015	29	15	31	31	GOOD
17/8/2015	29	14	33	33	GOOD
19/8/2015	27	13	27	27	GOOD
21/8/2015	28	14	57	57	SATISFACTORY
24/8/2015	27	13	25	27	GOOD
27/8/2015	27	13	28	28	GOOD

KSPCB Building terrace (SC -328) for the month of September, 2015

AIR QUALITY INDEX (AQI)					
SUB INDEX				AQI	
Date/Month	NO2	SO2	PM10		
1/9/2015	27	13	26	27	GOOD
3/9/2015	29	14	52	52	SATISFACTORY
7/9/2015	28	13	46	46	GOOD
10/9/2015	27	12	29	29	GOOD
14/9/2015	24	13	41	41	GOOD
16/9/2015	27	13	31	31	GOOD
21/9/2015	25	12	35	35	GOOD
23/9/2015	28	13	37	37	GOOD
28/9/2015	24	12	40	40	GOOD

KSRTC Building, KR Circle (SC -040) for the month of August, 2015

AIR QUALITY INDEX (AQI)					
SUB INDEX				AQI	
Date/Month/Year	NO2	SO2	PM10		
4/8/2015	29	15	93	93	SATISFACTORY
7/8/2015	29	15	40	40	GOOD
11/8/2015	28	13	37	37	GOOD
14/8/2015	29	15	52	52	SATISFACTORY
18/8/2015	26	13	37	37	GOOD

20/8/2015	27	13	33	33	GOOD
22/8/2015	29	14	44	44	GOOD
25/8/2015	28	15	53	53	SATISFACTORY
28/8/2015	30	14	52	52	SATISFACTORY

KSRTC Building, KR Circle (SC -040) for the month of September, 2015

AIR QUALITY INDEX (AQI)					
	SUB INDEX			AQI	
Date/Month	NO2	SO2	PM10		
3/9/2015	28	14	49	49	GOOD
4/9/2015	28	13	41	41	GOOD
8/9/2015	29	15	91	91	SATISFACTORY
11/9/2015	26	13	38	38	GOOD
15/9/2015	30	16	79	79	SATISFACTORY
19/9/2015	27	13	36	36	GOOD
22/9/2015	29	14	59	59	SATISFACTORY
24/9/2015	31	16	52	52	SATISFACTORY

From the above interpretation of AQI for Mysuru city, the responsible parameter for pollution is PM_{10}. It can be seen from the above AQI table that for SO_2 and NO_2 pollutants air quality is good, however it is PM_{10} which is in Satisfactory category. It is due to various industrial processes and vehicular movement in the vicinity.