Assessment of Ozone Concentration by using Air Quality Index of Jabalpur, India

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ABSTRACT

Air pollution is a major concern of nowadays and AQI is a key tool which monitored the local air quality very well. The study has been conducted in Jabalpur, Madhya Pradesh, India to obtain the 8 h average AQI result of ozone during January 2012-December 2014. The result shows that in the year of 2013 the AQI of O₃ (34) was higher than 2012 (32) and 2014 (23). All the years are coded green color which means, it comes under low health risk zone.

1. Introduction

Today the alarming issue which has been continuously looking towards earth is air pollution. The chemicals, particulates or biological materials which can be causes discomfort, disease, or death to humans, damage other living organisms such as food crops, or damage the natural persona is termed as air pollutants. Generally, air pollutants are categorized in two types: primary and secondary. Usually, primary pollutants are directly emitted from a process, such as ash from a volcanic eruption, the carbon monoxide gas from a motor vehicle exhaust or sulfur dioxide released from factories. Secondary pollutants are not emitted directly, when chemical components react with primary pollutants in the presence of sunlight secondary pollutant is generate.

Fig. 1 Formation of tropospheric ozone

The developing countries continuously focused on their local air quality to find out how they live and breathe in present atmosphere. The U.S. Environmental Protection Agency (EPA) and our local air quality agencies have been working hard to get more information about outdoor air quality similar to weather forecasting. Thus Air Quality Index (AQI) is a key tool which can be easy to get the air quality results [1-5]. EPA and other air quality agencies have been already given their AQI, to provide simple information about its air quality which directly influenced the health. Bisboi et al studied the comparative air quality index based on factor analysis and US-EPA methods for an urban environment for better result [6].

Generally, an AQI value corresponds to the National Air Quality Standards (NAQS), which has already being set a level by EPA [7], to protect public health. To better understand the AQI is divided into six levels of health concerns (Table 1).

Table 1 Air quality index by EPA [8]

<table>
<thead>
<tr>
<th>AQI ranges</th>
<th>Levels of health concern</th>
<th>Symbolized colors</th>
</tr>
</thead>
<tbody>
<tr>
<td>0-50</td>
<td>Good</td>
<td>Green</td>
</tr>
<tr>
<td>51-100</td>
<td>Moderate</td>
<td>Yellow</td>
</tr>
<tr>
<td>101-150</td>
<td>Unhealthy for sensitive groups</td>
<td>Orange</td>
</tr>
<tr>
<td>151-200</td>
<td>Unhealthy</td>
<td>Red</td>
</tr>
<tr>
<td>201-300</td>
<td>Very unhealthy</td>
<td>Purple</td>
</tr>
<tr>
<td>300-500</td>
<td>Hazardous</td>
<td>Maroon</td>
</tr>
</tbody>
</table>

Each group has corresponds to a different level of health concerns:

1) **Good**: The AQI ranges in between 0-50. Air quality is satisfactory and possess little or no health issues.
2) **Moderate**: The AQI ranges in between 51-100. Pollution in this range may pose a moderate health concern for a very small number of individuals.
3) **Unhealthy for Sensitive Groups**: When the ranges of AQI are in between 101-150, the members of sensitive groups may experience health effects, but the general public is unlikely to be affected.
4) **Unhealthy**: Everyone may experiences some health effects under the range of AQI in between 151-200. Members of sensitive groups may be suffering from more serious health effects.
5) **Very Unhealthy**: The AQI values in between 201-300, which trigger a health alert. It means, everyone in this group may experience more serious health effects.
6) **Hazardous**: When AQI ranges going over 300, it triggers health warning of emergency conditions. The entire population is even more likely to be affected by serious health effects.

Basically AQI has been calculating to enhance a global air quality. To investigate level of AQI of various air pollutants over the cities has today’s need. Many air quality standards are present which is helping to get accurate AQI [9]. Such as, AQI of Ozone with its concern impact is present here under:
The study is significant to gain information about the ambient air quality of the city Jabalpur [11]. The observation has continuously been monitored by AAQMS (Ambient Air Quality Monitoring System). In the upcoming years, AAQMS is going to enforce in each city to aware the quality of the city Jabalpur.

3. Results and Discussion

AAQI provides all the beneficial aspects which cover the health of atmosphere as well as human beings. The standard AQI has already fixed which has been updated in all the years (Table 3 and 4). While seen area wise, the AQI of Jabalpur demonstrate the quality of ambient air and the 8 h average during the studied period.

The resultant table of annual AQI shows green color in all the years. Thus, all the values are between the range of 0 - 50 and there is very less or no health issues were found related to ozone. In 2014, an AQI value was very low, which has been given the assurance that, in the upcoming years no health issues were found related to ozone. In 2014, an AQI value was very low, which has been given the assurance that, in the upcoming years no health issues were found related to ozone. In 2014, an AQI value was very low, which has been given the assurance that, in the upcoming years no health issues were found related to ozone.
which means good air quality; whereas, AQI ranges more than 50 up to 100, coded ‘yellow’ which means air quality is moderate, needs to control on air pollution.

4. Conclusion

The AQI gives the clear layout about ambient air and its critical pollutant, which is mainly responsible for destroying the quality of ambient air and human health. Though the three year result has shown quite good green color mainly in Jabalpur. But, while observing the monthly average, the yellow moderate color is a primary warning. It was not a ignoring observation. The developing city Jabalpur, wants to do many air quality related task which will gives ideal monitoring observations.

References