Quality of Air in Urban and suburban Area's of the Prishtina's and Meteorological Impact Conditions in Distribution of Pollution

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Abstract:

In this study we have taken Pristina, as it is one of the cities with the largest number of residents in Kosovo and has an extension in the vicinity of 5 miles Thermo central area near the Kosovo A and B, which for this region is considered as potential pollutants air with PM10, PM2.5, SO2, NOx, CO.

This power plant during technological processes for production of electricity releases a high amount of air pollutants that endanger the health of the population in areas around the power plants, where as the area under the influence of pollution from power plants this country considered 138 formal settlements.

We are focused on air pollution with Suspended Partikel Metters PM10, PM2.5 and TSP (Total suspended particles) for suburban and urban area of Pristina, where at the same time we also measures meteorological parameters and phenomena in these monitoring points in order to see how meteorological conditions affecting the distribution of pollution and how pollution will reach it even within the city of Pristina.

PM10 , PM2.5 and TSP were measured by continuous automatic monitoring, the instrument Sharp 5030 (methods combined nephelometer beta attenuation), Airpointer , Grimm and with the volume low sampler (LVS) Derenda, where the particles collected on the filter were then analyzed in AAS (atomic absorption Spektrometri of) where the determination of heavy metals.

Key Words: air quality in urban and suburban area, the impact of conditions in meteorological distribution of pollutants in the air.

Air quality in urban and suburban area

Air quality in Pristina monitored by three automatic monitoring stations (see Fig.1). In these stations monitored air pollution with SO2, NO2, CO, O3, tsp (Total Suspended Particle), PM10 and PM2.5.si and meteorological parameters (see table 1).

Station No.1. is ISHP1 station (Public Health Institute) located in the urban area of Pristina. This station is representative for air pollution from traffic. Station No. 2 is ISHP2 station, which is located in the south of Pristina in the vicinity of the object of IPH (QKUK area) an area which can be called as area sensitive, since people here attend high sensitivity to air pollution.
Station to station No. 3 is IHMK (Hydrometeor logic Institute of Kosovo), is representative of air quality in suburban area, because it is located in suburban area of the city of Pristina. From this station we can see the influence of air pollution from power plants A and B located in the vicinity of three-four miles from the station monitoring.

<table>
<thead>
<tr>
<th>Pollution Location</th>
<th>SO2 [µg/m³]</th>
<th>NO2 [µg/m³]</th>
<th>CO [µg/m³]</th>
<th>PM 2.5 [µg/m³]</th>
<th>PM10cont [µg/m³]</th>
<th>TSP [µg/m³]</th>
</tr>
</thead>
<tbody>
<tr>
<td>ISHP 1</td>
<td>+</td>
<td>+</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ISHP 2</td>
<td>+</td>
<td>+</td>
<td></td>
<td></td>
<td></td>
<td>+</td>
</tr>
<tr>
<td>IHMK3</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>+</td>
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</tbody>
</table>

Table 1. Pollutants that are monitored in the automatic monitoring stations of air quality in Pristina

**Methods of measurement**

Monitoring of air quality has become the method of automatic measurement, what it means, the measurements were recorded in each 5 minutes, but the processed results taken in each half hour. Equipment used for monitoring air quality by the firm are Air pointer ® recordum and Analyzerst Thermo Scientific (fig.2 and 3).

Discussion of Results

This study was made based on monitoring of air quality during winter season i.e. during the months January, February, March, September, October, November and December 2009 at three stations in Pristina niotmorimit automatic.

During this period monitored is noticed that the air quality in urban and suburban area is not satisfactory. Air quality problem in these areas represent high concentrations of suspended particles in air. During this period were recorded exceeding the limit values (according to the EU) with PM10 monitoring station in IHMK (tab.2), and the monitoring station in tsp ISHP1 and ISHP2, but with other pollutants has not been exceeding the limit values in either from three monitoring stations.
Tab.2 Monitoring of air Quality station IHMK

The monitoring station registered IHMK high values of particles PM10 and PM2.5. Max monthly value of PM10 (278.63 µg/m3) was recorded November us, while Max monthly value registered PM2.5 was (148.87µg/m3) also in November. The minimum monthly value registered with the PM10 is (14.07µg/m3) in January and PM2.5 (10.23 µg/m3) was recorded in February (tab.3 and 4).
Tab.4. Average values, max and min. PM 2.5 monthly station IHMK (Prishtina1)

Likewise ISHP1 monitoring stations and has ISHP2 tsp high values where the average monthly value during the months that is monitored has been 104.62µg/m³ station ISHP1, then the average value ISHP2 station has been registered and 108.07µg/m³ station IHMK monitoring value of PM10 + PM2.5 particles has been 91.58µg/m³.

If done in a comparison of values recorded over the monitoring station IHMK (urbanbegrand) and ISHP1 and ISHP2 monitoring stations (urban) 1) we see that higher values of pollution with suspended particles are registered in urban stations in ISHP1 and ISHP2 compared with station IHMK urbanbegrand (tab.5. and Fig.3). However, the three stations that have recorded high values, what it means. that we have overcome the limit values (according to EU standards for air quality) in the three stations.

Tab.5. Tsp Monitoring and PM10 + PM2.5 in three existing stations in Pristina for the period January-March 2009 and January-March 2010 ne ihmk

Fig.3. Thermo Scientific,Station of monitoring IHMK

*ISHP1 and ISHP2 stations monitoring air quality by the Institute of Public Health of Kosovo, a source of data for these stations*

Higher values result in IHMK station (urbanbegrand) is the impact of air pollution caused by emissions of plant A and B as well as meteorological conditions that have dominated during these days. While urban monitoring stations contributing to higher values of particles (air pollution) is the transport and pollution...
that comes from power plants A and B, since the city of Prishtinës is extended to the area that is considered as the area under the influence of pollution by plants, this proven by the fact that high concentrations of particles are recorded in station urbanbegrand (IHMK).

**Influence of Meteorological Conditions on the Distribution of Air Pollution**

Based on meteorological data of meteorological station in Pristina seen that Direction dominant wind direction is north east (Fig.4), but also in other directions where the intensity has wind force striking presence of wind is little. From this the above results that the distribution of particles over 90% is in the direction of northeast where pollution is greatest in those spaces, ie in northeastern orografis geographic distribution of terrain.

![Advantages wind direction](image)

**Fig.4. The wind rose in Pristina for the monitoring period September 2009-March 2010**

As seen from the wind rose direction dominan northeast wind was 8% and 6% of the monitoring period (September 2009-Mars2010) dominates in the South West.

**Conclusion:**

- From the study made during the period from January-March 2009 and September 2009-Mars2010 is noticed that the key problem in air quality in Pristina is a high concentration of dust particles suspended in air.
- The fact that Pristina lies in a close of 5 Km from plants A and B can say that one of the factors that cause the pollution of air with suspended particles is the Emission of particles from these power plants.
• Increase the intensity of circulation of vehicles, their number increased, the use of fuel without the appropriate checks with high content of lead, reduction of green areas, are some indicators that affect the enormous growth of air pollution
• discharges from vehicles (suspended particles and dust) that are created on the streets of the capital contribute to increase air pollution causing health problems such as difficulty of breathing the problems of the cardiovascular system, immune system damage, anemia, immune system i-regulations, vision disorders, etc..
• Air pollution in Pristina exceed rates allowed under EU.

References:

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3. Pollution Report January-March 2009, the National Institute of Public Health of Kosovo