THE LEVEL OF AIR POLLUTION WITH SEDIMENT PARTICLES IN SĂLAJ COUNTY IN 2015

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Abstract

This paper presents the study conducted on sediment particles in the area of Sălaj county for the year 2015. The data were obtained from the Sălaj County Environmental Protection Agency, located in Zalău, the institution which monitors the level of pollution with sediment particles. In the area of Sălaj county there are 11 sampling points, spread strategically in the county. The samples were collected on a monthly basis.

The 11 sampling points are the following: the Environmental Protection Agency of Zalău (A.P.M. Zalău), the Weather Station in Zalău, 22^{nd} December 1989 Str. in Zalău, Stadium Neighbourhood in Zalău, Sărmaş Str. in Zalău, Şimleu Silvaniei, Jibou, Cehu Silvaniei, Prodăneşti, Sărmăşag and Panic.

The evolution of sediment particles in 2015 was the following: the highest average concentration was recorded at the sampling point located in 22^{nd} December 1989 Str., with a concentration of 15.036 g/m², and the lowest, 4.108 g/m², at A.P.M. Zalău.

The analysis of the monthly evolution of sediment particles in 2015 shows that the highest average concentration of the 11 sampling points was recorded in August, 14.464 g/m², and the lowest one in January, 2.145 g/m².

Key words: highest allowed concentration, monitoring, sampling points, sediment particles

INTRODUCTION

Sediment particles are particles of matter, either solid or liquid, with one or more chemical substances in their composition. The particles can be found in various forms (dust, smoke, soot, nitrates, asbestos, pesticides, bioaerosols).

These particles are either of anthropic origin (biomass burning, industrial processes, road traffic, agricultural activities) or the result of natural phenomena (volcanic eruptions, sand and dust storms, naturally occurring forest fires). These particles in the atmosphere result from physical and chemical transformations of natural or anthropic gaseous substances (Surpățeanu, 2004; Moza, 2009, 2010; Pereş, 2011).

The main sources of pollution are: fossil fuel power plants; the building materials and construction industry; the metallurgical industry; the chemical and petrochemical industry; the extractive industry; the incineration of household waste; road traffic (Köteles, 2011).

MATERIAL AND METHOD

In the study conducted on air pollution with sediment particles in the are of Sălaj county data obtained from the Sălaj County Environmental Protection Agency, located in Zalău, were used. The monitoring of air pollution in Sălaj county is performed by the above mentioned institution.

Air pollution with sediment particles in the area of Sălaj county is monitored at 11 sampling points. Five of these sampling points can be found in Zalău (at the premises of the A.P.M., at the weather station, in 22nd December 1989 Str., in the Stadium Neighbourhood and in Sărmaş Str.), and the others in various places of the county: Şimleu Silvaniei, Jibou, Cehu-Silvaniei, Prodăneşti, Sărmăşag and Panic (apmsj.anpm.ro).

RESULTS AND DISCUSSION

1. Annual evolution of sediment particles

In 2015, the highest average concentration of sediment particles was recorded at the sampling point located in 22^{nd} December 1989 Str., in Zalău, 15.036 g/m², a value which did not exceed the highest allowed concentration. The lowest concentration was recorded at the sampling point A.P.M. Zalău, 4.108 g/m². Values close to this one were recorded in Jibou and Panic, 4.933 g/m² and 5.142 g/m² respectively. At the other monitoring points the pollution levels were comparatively uniform, with concentrations between 6.109 and 9.008 g/m² (Fig. 1).



Fig. 1. The evolution of average concentrations of sediment particles at the sampling points in Sălaj county in 2015

2. The monthly evolution of sediment particles

The analysis of the monthly evolution of sediment particles in 2015 reveals that the average concentration of the 11 sampling points reached the highest value in August, 14.464 g/m^2 , which was followed by April, 13.145

 g/m^2 (Fig. 2). The lowest concentrations were recorded in the months of January and December, 2.145 g/m^2 and 2.360 g/m^2 respectively.

The results obtained for the 11 sampling points show that the highest allowed concentrations were not exceeded.



Fig. 2. The monthly pattern of sediment particles in Sălaj county in 2015

Figure 3 shows the annual evolution of sediment particles at the Zalău Weather Station. It can be seen that the pollution with sediment particles exceeded the highest allowed concentration in February, when the level of pollution was 24.900 g/m². In the other months, the concentrations were between 1.300 and 10.900 g/m².



Fig. 3. The monthly pattern of sediment particles at the Zalău Weather Station sampling point in 2015

The monthly pattern of sediment particles for the 22^{nd} December 1989 Str. sampling point shows that the highest allowed concentration was exceeded in four months. In August, the concentration level of sediment particles was 39.300 g/m², in April 24.900 g/m², in July the level of pollution was 19.700 g/m², and in June 18.900 g/m². In the other months of the year the concentrations were within the allowed limit (Fig. 4).



Fig. 4. The monthly pattern of sediment particles at the 22nd December 1989 Str. sampling point in Zalău in 2015

The highest allowed concentration was exceeded at the Stadium Neighbourhood sampling point in Zalău in July and April, the values were 23.500 g/m^2 and 18.400 g/m^2 respectively (Fig. 5).



Fig. 5. The monthly pattern of sediment particles at the Stadium Neighbourhood sampling point in Zalău in 2015



Fig. 6. The monthly pattern of sediment particles at the Prodănești sampling point in 2015

At the Prodănești sampling point the highest allowed concentration was exceeded in August, the value recorded was 34.000 g/m^2 (Fig. 6).

The level of pollution with sediment particles at the Sărmăşag sampling point was high in May, 19.9 g/m², which was above the highest allowed concentration (Fig. 7). A high level of sediment particles was recorded in August too, 16.6 g/m², but the highest threshold was not exceeded.



Fig. 7. The monthly pattern of sediment particles at the Sărmăşag sampling point in 2015

CONCLUSIONS

The study of the averages of the 11 sampling points for the year 2015 shows that the highest level of pollution with sediment particles was recorded at the 22^{nd} December 1989 Str. sampling point in Zalău, a concentration of 15.036 g/m², and the lowest at the A.P.M. Zalău sampling point, 4.108 g/m².

The highest concentrations were recorded in the summer months, as this period of the year has the highest rainfall amounts. In the cold season, the concentration levels of sediment particles at most sampling points reach the lowest concentrations.

At five sampling points the highest allowed concentration (17 $g/m^2/month$) was exceeded in 9 cases. The sampling points with concentrations above the highest allowed value are: Zalău Weather Station, 22^{nd} December Str. 1989 in Zalău, Stadium Neighbourhood in Zalău, Prodănești and Sărmășag.

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