

ANALYSIS OF THE LEVEL OF POLLUTION WITH SEDIMENT PARTICLES IN THE AREA OF BIHOR COUNTY IN 2021 – 2023

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RESEARCH ARTICLE

Abstract

In this paper we studied the level of air pollution with sediment particles over a period of three years (2020 - 2023). The data used were from the Environmental Protection Agency Bihor Oradea, which is responsible for monitoring the level of pollution in Bihor County. In the area of Bihor County are located 10 sampling stations. These sampling stations are in Telechiu, Chistag, Alesd, Tetschea and monitor the industrial area in the Alesd area. Baile 1 Mai, St. Meteorology, APM Bihor, Biharia, Salard and Episcopia Bihor monitor the Oradea industrial platform. Sediment particles causes in slow flow with a monthly harvest frequency. From the processing of data on sedimentary dust pollution we can conclude that the maximum permissible concentration that is 17 g/m²/the month was exceeded only once at the sampling point in Telechiu in 2021, April (17.55 g/m²).

Keywords: sedimentable powders, monitoring, sampling points, maximum permissible concentration
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INTRODUCTION

Sediment particles can come from many processes such as mechanical, construction, road transport, tailings and tailings, steel and metallurgical industry, building materials industry, etc. (Mahara Ghe., 1976, 2003, Moza Ana 2009, 2010, 2011 and Koteles N., 2010).

MATERIAL AND METHOD

For this paper we used data from the Environmental Protection Agency Bihor Oradea, a body that deals with the monitoring of air pollution in Bihor County.

In Bihor there are 10 sampling points for sediment particles these are: Telechiu, Chistag, Alesd, Țețchea, Baile 1 Mai, St. Meteorology, APM Bihor, Biharia, Salard and Episcopia Bihor. The ten stations cover all industrial areas in the counties as well as urban areas (www.apmbh.ro).

The period considered is 2020 – 2023 and the maximum permissible concentration is 17 g/m²/month (monthly harvest frequency) (STAS 12574/1987, Order 592/25.06.2002).

RESULTS AND DISCUSSIONS

Annual evolution of sediment particles

Following the analysis of the concentrations of sediment particles, in 2021 the highest concentration was determined at the sampling point in Țețchea 9.75 g/m² followed by Bihor Episcopia 8.33 g/m² and Chistag 7.78 g/m². For 2022 the highest concentration was determined

in the Episcopia Bihor 9.44 g/m², 8.46 g/m² in Salard and 7.23 g/m² in Telechiu. And in the last year under study 2023 the highest value was in Salard 10.51 g/m², followed by Episcopia Bihor 8.51 g/m² (Figure 1).

From the analysis of the three-year averages taken into account (2021 – 2023), it follows that the highest concentration was recorded at the Episcopia Bihor sampling station of 8.76 g/m², which is, followed by 7.97 g/m² in Salard and 7.85 g/m² in Țețchea.

The lowest values were recorded in Alesd (5.09 g/m²), Biharia (5.11 g/m²) and St. Meteorological (5.13 g/m²) (Figure 2).

Monthly evolution of sediment particles

From the analysis of the ten sampling points we can admit that for 2021 the higher concentration was determined in July with a value of 7.99 g/m², followed by September 7.75 g/m² and May 7.57 g/m².

In 2022 the highest concentration of sediment particles concentrations were in October (8.92 g/m²), July (8.38 g/m²) and December (8.33 g/m²).

In the last year of the 2023 study, the highest concentrations were April 9.88 g/m², March 9.31 g/m² and July 8.21 g/m² (Figure 3).

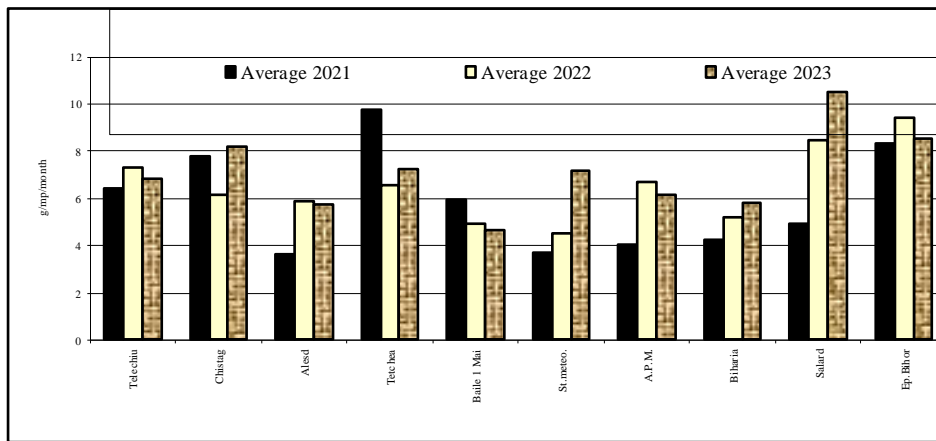


Figure 1. The evolution of sediment particles average concentrations in Bihor county, 2021 – 2023

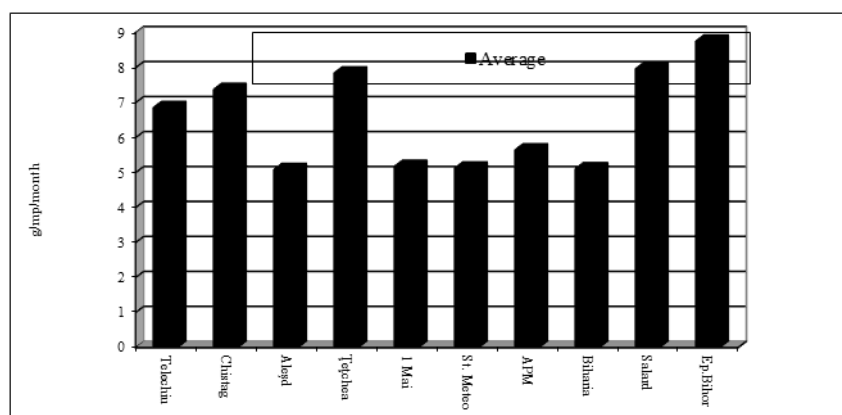


Figure 2. Evolution of the multiannual average concentrations (2021 – 2023) of sediment particles at the 10 monitoring points in Bihor county

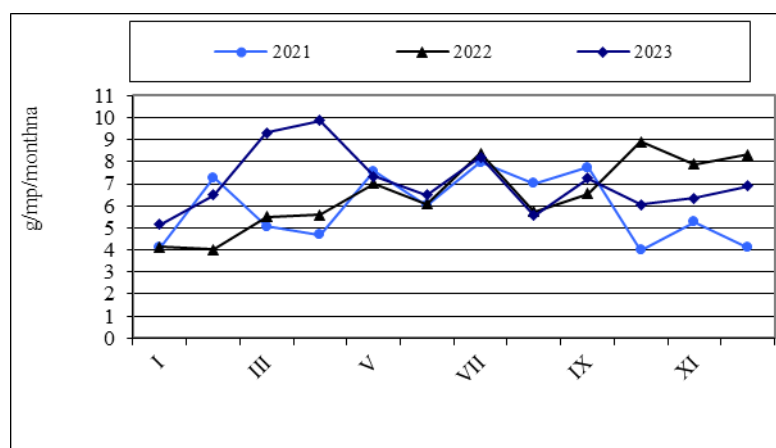


Figure 3. Monthly pattern of sediment particles in Bihor county (the average of the 10 sampling points)

From the study of monthly variations for the years under study 2021 – 2023, it turns out that the highest average was recorded in July of 8.18 g/m², in May of 7.31 g/m² and September 7.18 g/m² (Figure 4).

Evolution of pollution by sediment particles at sampling points

At the sampling point in Telechiu in 2021 the highest concentration was recorded in April of 17.55 g/m² when the maximum permissible

concentration was exceeded. Higher values were also determined in September by 16.88 g/m².

For 2022 the highest concentration was determined in August of 13.81 g/m² and in July of 13.66 g/m².

In 2023 the highest concentrations were in April (12.30 g/m²), June (8.93 g/m²) and July (8.25 g/m²) (Figure 5).

At the harvest point in Țețchea, the highest concentrations for 2021 were in February 15.98 g/m² and January 14.75 g/m².

In 2022, the highest level of sediment particles pollution was in April 12.52 g/m².

And in the last year of the 2023 study, the highest concentration was in April 12.52 g/m² (Figure 6).

At the monitoring point in Oradea located at the Meteorological station, the highest concentrations in 2021 were determined in September of 6.35 g/m² and July of 6.34 g/m².

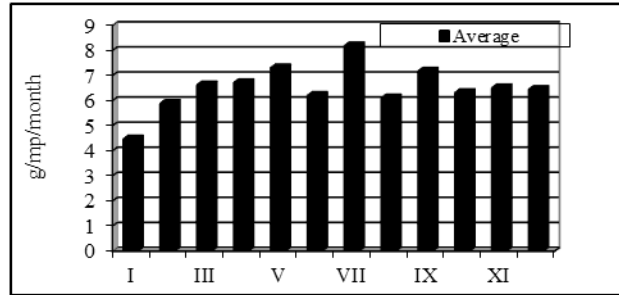


Figure 4 The evolution of multiannual monthly average concentrations of sediment particles in Bihor (the average of the 10 sampling points)

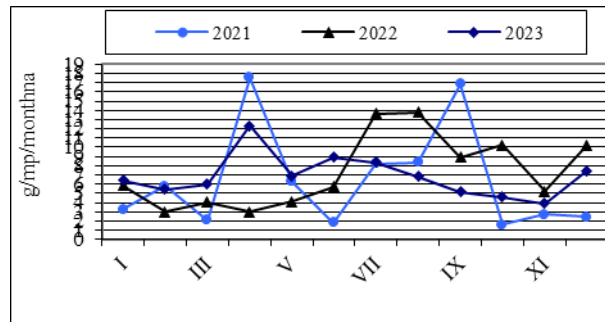


Fig. 5. Monthly evolution of sediment particles at sampling point Telechiu

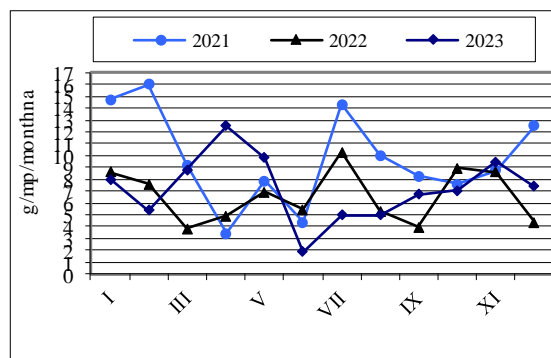


Fig.6. Monthly evolution of sediment particles at sampling point Țețchea

For 2022, the highest concentration was determined in October at 8.38 g/m².

And in 2023 the highest concentration was reached in October 8.38 G/m², followed by July 7.50 g/m² (Figure 7).

At the sampling point in Oradea the APM Bihor headquarters in 2021 the highest concentrations were determined in August of 7.27 g/m² and 6.29 g/m² in July.

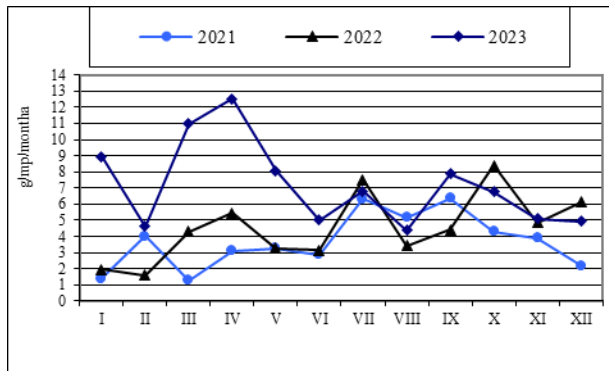


Fig.7. Monthly evolution of sediment particles at sampling point Meteorological Station Oradea

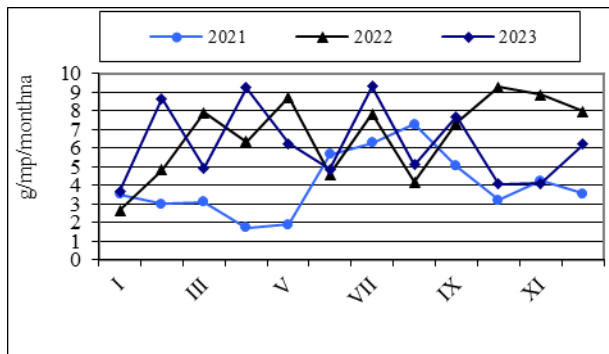


Fig.8. Monthly evolution of sediment particles at sampling point APM Bihor Oradea

CONCLUSIONS

From the analysis of the average of the sampling points in the number of 10 sampling stations, for the years studied (2021 – 2023), for the years studied, it follows that the level of pollution with sediment particles the maximum permissible concentration (17 g/m²/month) has not been exceeded.

For 2022 the highest concentration was recorded in October at 9.27 g/m², followed by 8.89 g/m².

In 2023, July was determined the highest concentration of 9.31 g/m², and in April the concentration was 9.25 g/m² (Figure 8).

We studied separately the sampling points in the industrial area in the Alesd area, from which it turned out that in Telechiu the threshold of 17 g/m²/month, was, it was exceeded in 2021 April (17,550 g/m²).

The study shows that in the localities of Telechiu, Chistag, Alesd there is a more pronounced pollution with sediment particles, but the maximum permissible concentration is not exceeded, only in the case of accidents or weather conditions that favor the deposition of sediment particles and the lack of precipitation.

The pollution with sediment particles in the area of Oradea is also reduced. But in some cases it can be accentuated when meteorological factors do not favor dispersion.

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