

THE SPATIAL AND TEMPORAL DISTRIBUTION OF LEAD IN SNOW: CASE STUDY OF JELGAVA CITY

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Abstract

The growing global population is creating high demand for transport and the various goods industries, which produce lead-generating emissions from air pollutants. The increase in lead concentration is very dangerous because it affects the nature and human health around us. The great concern for human health and the environment has contributed to research on lead concentrations around us. The aim of the study is to clarify the prevalence of lead in Jelgava between 2018 and 2021. The winter period was selected for this study, as it is possible for snow to collect samples from the urban drilling environment, where lead dust from urban pollution lands on the snow surface. The snow was collected from 60 points in the city, where high traffic intensity, railway infrastructure and various types of industry are found. The samples were analysed over a four-year period, with a total of 240 samples. Samples were collected at each point, creating a 15 x 15 cm area in the snow and collecting all the snow to the soil from the established area. Below, these snow samples were stored for a few days in a refrigerator with temperatures ranging from +3 to +5 °C and transported to a laboratory where lead concentrations were determined in snow samples. Lead concentrations in snow samples are determined to determine the intensity of their release in nature, linked to the rapid increase in anthropogenic activities in the last two centuries. Cases of increased lead accumulation have already been observed in wild animals. It is therefore necessary to carry out detailed studies on lead concentrations in nature and their potential for increase. In the analysis of lead concentrations, it was found that the highest lead concentrations were in 2018, when their median was 3.59 µg/L, with a maximum value of 51.8 µg/L. The smallest lead concentrations were found in the 2020 measurements, when their median was 0.17 µg/L, with a maximum value of 6.65 µg/L in the analysis. The data collected, it can be concluded that there are very large variations in data and unpredictable concentrations associated with the intensive traffic of vehicles, industry, road repairs and fireworks at different festivals.

Keywords: lead, air quality, pollution, ICP-AES, snow contamination