

# ASSESSMENT OF CHEMICAL ELEMENTS POLLUTION FROM VEHICLE EMISSIONS: CASE STUDY OF JELGAVA CITY

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## **Abstract**

Particulate air pollution from transport in cities, especially from cars, involves a variety of harmful compounds, including fine iron and heavy metals, which can persist in the air for long periods of time, increasing harmful effects on human health and creating a risk of environmental pollution. In Europe, more and more attention is being given to the chemical composition of dust not only their concentration in cities. The aim of the study is to determine which parts of the city have the highest pollution of chemical elements. We studied snow packs as collectors of these ubiquitous particles in cities. Samples were collected on February 14, 2018 and January 11, 2019, when snow accumulation had occurred for at least 7 days. Samples were collected in 59 different areas of the Jelgava city and one sample was collected in the SE direction outside the city, which is located approximately 15 km from the centre of Jelgava city. Both years' 177 snow samples were collected at different locations in the Jelgava city and 3 control samples outside the city. Chemical elements related to cars and traffic flow were identified in the snow: Lead (Pb), Chromium (Cr), Arsenic (As), Nickel (Ni), Manganese (Mn), Zinc (Zn), Copper (Cu). Concentrations of chemical elements were determined by inductively coupled plasma optical emission spectrometry (ICP-OES). As a result of the study, pollution maps of chemical elements have been developed, which characterize the intensity of pollution and illuminate high pollution sites in the Jelgava city. Thematic maps are created in ArcGIS 10.3 using the inverse distance weighted (IDW) method. Spatial information on the distribution of chemical elements shows the main traffic lines and traffic junctions in the Jelgava city, which were characterized by elevated concentrations of As, Pb, Cr, Mn, Ni, Cu, Zn.

**Keywords:** heavy metals, traffic, transport, roundabout, ICP-OES