



## Surface runoff deposits and soils contamination in urban areas in Belarus

**Marharyta Kazyrenka**<sup>1</sup> and Tamara Kukharchyk<sup>2</sup>

<sup>1</sup>Institute for Nature Management of the National Academy of Sciences of Belarus, Minsk, Belarus  
(margarita\_kozyrenko@tut.by)

<sup>2</sup>Institute for Nature Management of the National Academy of Sciences of Belarus, Minsk, Belarus  
(tkukharchyk@gmail.com)

In the paper the results of study of surface runoff deposits and soils in two Belarusian cities are shown. It is known that urban soils are under significant anthropogenic impact. Investigations of industrial areas are limited due to the lack of direct access to them. In the same time soils on industrial sites can be a significant source of further contamination of adjacent urban area as a result of water and wind activity. Thus, surface runoff deposits can serve as an indicator of industrial soil pollution. Moreover, the redistribution of pollutants with surface runoff can also cause secondary urban soil contamination. The understanding of pollutants migration and accumulation in urban soils and their possible exposure routes into rivers is an important part of urban area investigations and planning.

The main objective of the study was an assessment the levels of pollutants in runoff deposits and revealing the role of surface runoff in the migration of pollutants from industrial sites.

Investigations of urban areas were carried out in 2008–2019 in Minsk and Lida, Grodno region (Belarus). Soil samples were taken from upper soil layer (mainly 0-5, 0-10 cm) in the territory of industrial enterprises and in their impact zones. Runoff deposits were sampled mainly in areas covered with asphalt or concrete near industrial enterprises and along roads. Particular attention was paid to areas with a slope of surface from enterprises. AAS method for heavy metals determination was applied; the content of total petroleum hydrocarbons was determined by fluorimetric method.

Elevated content of heavy metals and petroleum hydrocarbons in surface runoff deposits has been revealed. The concentrations of pollutants in runoff deposits were many times higher than in soils. Significance of differences between pollutants content in soils and deposits samples is statistically confirmed. Exceeding the maximum permissible concentrations for petroleum hydrocarbons was observed in 100%, for metals – in 70–100% of analyzed surface runoff deposits samples.

The findings confirm an important role of surface runoff in migration and accumulation of pollutants and suggest the need for more in-depth studies of urban areas with the study of local

erosive processes, the characteristics of formation and role of surface runoff in the migration and redistribution of pollutants outside their direct sources. The adoption of measures to prevent pollutants migration from industrial areas is an important factor in improving the state of soils in urban areas.