STUDY OF A SNOW COVER POLLUTION IS ONE OF THE MAIN FACTORS OF A SURFACE RUNOFF FORMATION OF THE CITY OF UFA

Nail S. Minigazimov
Bashkir State Agrarian University, 34, 50-letiya Octyabrya St., Ufa, 450001, Russia, D. Sc., Professor, Department of Land Management, Construction and Hydraulics, phone: (917)418-54-14, e-mail: nail.minigazimov@mail.ru

El'nara T. Khaydarshina
Bashkir State Agrarian University, 34, 50-letiya Octyabrya St., Ufa, 450001, Russia, Senior Lecturer, Department of Land Management, Construction and Hydraulics, phone: (927)350-91-19, e-mail: elnara_tim@mail.ru

Bakhytgaley N. Batanov
Bashkir State Agrarian University, 34, 50-letiya Octyabrya St., Ufa, 450001, Russia, D. Sc., Professor, Department of Land Management, Construction and Hydraulics, phone: (927)941-11-08, e-mail: elnara_tim@mail.ru

More than half of the population of the planet lives in cities, due to this intense pollution of the urban environment is a serious environmental problem. There is a maximum accumulation of waste from the functioning of mankind in cities – emissions, discharges, toxicants, disposal of liquid and solid waste. Volumes of emissions of harmful substances into the atmosphere are constantly growing, which indicates the need and importance of a systematic study of air pollution in urban areas. A special role in assessing the ecological state of the environment of cities is assigned to the study of toxic heavy metals.

The purpose of this study is to analyze the chemical composition of snow cover in various functional areas of Ufa and to identify the relationship between the level of anthropogenic impact and the presence of pollutants in the snow.

The snow cover has a high sorption capacity and is an informative object in identifying man-made pollution of the urban environment. The condition of snow cover is a reliable indicator of air pollution and subsequent pollution of water bodies and soil. As a result of accumulation, the content of chemical compounds in snow is 2-3 times higher than in atmospheric air. Data on the content of substances in snow cover are the only materials for assessing regional air pollution in the winter period over large areas and identifying the distribution range of pollutants.

Key words: snow cover, pollutants, heavy metals, oil products, surface runoff, Ufa city.

REFERENCES

1. Raputa, V. F., Kokovkin, V. V., & Morozov, S. V. (2010). Experimental studies and numerical analysis of the pollution of snow cover in the vicinity of a large highway in Novosibirsk. *Khimiya v interesakh ustoychivogo razvitiya [Chemistry for Sustainable Development]*, *18*(1), 63–70 [in Russian].

2. Vasilenko, V. N., Nazarov, I. M., & Fridman, Sh. D. (1985). *Monitoring zagryazneniya snezhnogo pokrova [Monitoring of snow pollution]*. Leningrad: Hydrometeoizdat Publ., 182 p. [in Russian].

3. Kokovkin, V. V., Raputa, V. F., Devyatova, A. Yu., Chirkov, V. A., & Kaz'min, O. E. (2010). Analysis of the state of long-term air pollution and snow cover in the city of Novosibirsk. In *Sbornik materialov GEO-Sibir'-2010: T. 4, Ch. 1 [Proceedings of GEO-Siberia-2010: Vol. 4, Part 1]* (pp. 171–175). Novosibirsk: SSGA Publ. [in Russian].

face runoff. In *Sbornik materialov Mezhdunarodnoj nauchno-prakticheskoj konferencii, posvyashchennoj pamyati professora Anatoliya Pavlovicha Kuz'mina: Ehkologiya. Risk. Bezopasnost' [Proceedings of* the International Scientific and Practical Conference dedicated to the memory of Professor Anatoly Pavlovich Kuz'min: Ecology. Risk. Security] (p. 45). S. K. Belyakin (ed.) [in Russian].

19. Buryachok, O. V. (2010). Influence of atmospheric precipitation on the underground hydrosphere of Ufa. In *Mezhvedomstvennyj sbornik tezisov, posvyashchennyh Vsemirnomu dnyu vodnyh resursov. [Proccedings of Theses devoted to the World Water Day]* (pp. 36–39). Ufa: Informreklama Publ. [in Russian].

20. Minigazimov, N. S., & Khamitov, R. Z. (1994). Methodological features of the ecological status assessment of the "Big City" (on the example of Ufa). In *Tezisy dokladov Nauchnogo seminara-vystavka: Problemy ehkologicheskogo monitoringa [Proceedings of Scientific Seminar-Exhibition: Problems of Environmental Monitoring]* (pp. 72–73). Ufa [in Russian].

21. Chernyaeva, L. E., Chernyaev, A. M., & Mogilevskikh, A. K. (1978). *Khimicheskiy sostav atmosfernykh osadkov (Ural i Priural'e) [The chemical composition of precipitation (the Urals and the Pre-Urals)]*. Leningrad: Gidrometeoizdat Publ, p. 179 [in Russian].

22. Temporary guidelines for the production of sampling and processing of snow samples in cities and their environs on the complex pollutants. Approved by decree of the State Committee for Hydrometeorology January 24, 1985, Institute of Applied Geophysics named after academician Fedorov E. K. January 24, 1985 [in Russian].

23. Guidelines for assessing the degree of danger of soil contamination by chemical substances. Approved by the Ministry of Health of the USSR March 13, 1987 No. 4266-87. (amended from Febrary 07, 1999. Retrieved from ConsultantPlus online database [in Russian].

24. Guidelines for assessing the degree of air pollution of populated areas by metals according to their content in snow cover and soil. Approved by the Ministry of Health of the USSR May 15, 1990 No. 5174-90. Retrieved from ConsultantPlus online database [in Russian].

25. Minigazimov, N. S., Daukaeva, R. F., Safina, G. G. (1995). The study of the snow cover of the city of Ufa on the content of dioxins and other supertoxicants. In *Materialy dokladov nauchno-prakticheskoj konferencii, posvyashchennoj 40-letiyu Ufimskogo NII MT i EHCH: Ehkologo-gigienicheskie problemy Ural'skogo regiona [Proceedings of Scientific and Practical Conference, dedicated to the 40th anniversary of the Ufa Research Institute of Occupational Medicine and Human Ecology: Ecological and Hygienic Problems of the Ural Region]* (pp. 131–133). Ufa [in Russian].

26. Lapikov, V. V., Zhdanova, N. V. et al. (1999). In *Tezisy dokladov konferencii: 165 let gidrometsluzhbe Rossii [Abstracts of the Conference: 165 years of Hydrometeorological Service of Russia]* (pp. 23–31). Ufa [in Russian].

27. Daukaev, R. A., & Suleymanov, R. A. (2007). Study of the snow cover contamination of the city of Ufa with heavy metals. *Bashkirskiy ekologicheskiy vestnik [Bashkir Ecological Bulletin]*, 1, 3–6 [in Russian].

28. Galeeva, E. M., Galimova, R. G., & Teplova, D. S. (2018). Comprehensive assessment of the state of the environment in Ufa. *Rossiyskiy zhurnal prikladnoy ekologii [Russian Journal of Applied Ecology]*, 1(13), 47–51 [in Russian].

29. Gareev, A. M., Galeeva, E. M., & Teplova, D. S. (2018). Spatial and temporal variability of environmental pollution under the influence of urban agglomerations (on the example of the Ufa industrial hub). *Vestnik Akademii nauk Respubliki Bashkortostan [Bulletin of the Academy of Sciences of the Republic of Bashkortostan]*, Vol. *28*, No. 3(91), 41–50 [in Russian].

Received 19.01.2019