some places. The dip directions of cross-laminae are dispersed in a wide sector to the south. These sand beds fill an incision of north-south direction eroded into the top surface of underlying till bed. This incision nearly prolongs the tunnel valley stretching from northwest to southeast which is occupied by lakes Ilgis, Klykių and Politiškių. The sand beds are considered to be deposited by flows and braided streams of moderate hydrodynamic activity as the result of the subglacial ice melt water discharge from the tunnel valley mouth. Fan-shaped sand deposits probably had been formed at the valley mouths, along the outer side of the glacier margin (Lelandais *et al.*, 2016).

The upper part of the sediment sequence from the lower one is separated by a boulder-rich horizon and is of a completely different structure. Extensive bodies of horizontal to low-angle stratified pebble, usually matrix-supported, horizontally stratified sometimes cross-bedded granules interspersed in coarse sand and various grained sand beds make sheet shape arranged rhythmites. These coarse-grained rhythmite sheet beds with interspersed outsized clasts have a slight or in some places quite high inclination to the east-southeast. The measured sand cross-laminae have the same preferred direction of dip. It may represent a sheetflow deposition from the ice margin. The sandy gravels, massive to crudely laminated occurring in thick boulder/cobblerich beds and massive gravel or gravel-sand sheets indicate cohesionless debris or grain flows in some places. Such structure of the upper part of the glaciofluvial sediment sequence infers a formation of the end moraines constituted of coalesced fans at the ice margin by redeposition of supraglacial material (Krzyszkowski & Zielinski, 2002).

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AVAILABLE FORMS OF HEAVY METALS IN BOTTOM SEDIMENTS OF THE SMALL LAKES OF URBAN AND NON-URBAN AREAS, REPUBLIC OF KARELIA

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Heavy metals are excellent indicators of negative anthropogenic influence to water objects. Bottom sediments of water objects are the main reservoir of heavy metals and play the role of secondary sources of anthropogenic pollution of the water environment. The analysis of heavy metals concentrations in bottom sediments is an important element of the complex environmental assessment of any waterbodies. Especially when the detection of different forms of heavy metals is needed during indicated investigations.

In this report, data on the concentrations of available forms of heavy metals in bottom sediments of the four small lakes of the Republic of Karelia are represented. All lakes are located in different parts of this region (fig. 1). Chetyrekhverstnoe Lake is located in Petrozavodsk city territory. Other researched lakes are located in non-urban (background) areas of the Republic of Karelia.

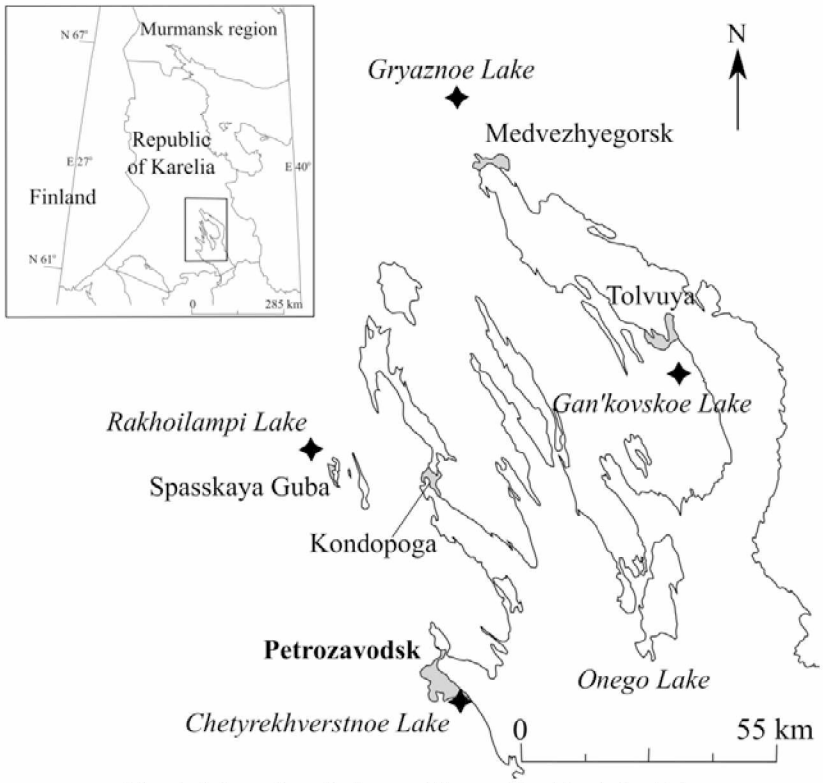

Fig. 1. Map of studied area (Created by Novitsky D.)

Samples were collected from the upper layers of the lake bottom sediments by the Ekman Bottom Grab Sampler. Extraction of microelements from previously dried samples of bottom sediments were done using CH_3COONH_4 (pH 4,8). Concentrations of heavy metals were measured by Inductively Coupled Plasma Mass Spectrometry (ICP-MS) in the analytical center of the Institute of Geology Karelian Research Centre of the Russian Academy of Science.

The sediments of all researched lakes are of the same type of sediments that are rich in organic matter (it is sapropel). The concentrations of heavy metals in bottom sediments of all studied lakes are taken in Fig. 2. It is shown that the content of all elements in deposits from Chetyrekhverstnoe Lake is higher than in other researched lakes. Especially the bottom sediments from the urban lake have the highest concentrations of Zn, Co, Ni, Cd, and Pb, which exceed concentrations of the same metals in sediments of non-urban lakes by 3 to 42 times. The main sources of anthropogenic pollution of this urban environment are emissions of machine-building enterprises, emissions of road and rail transport, household waste and traces of global air pollution in Northern Europe.

Thus conducted researches have shown the significant impact of large industrial cities of the north of Russia to contaminate the water environment. The concentrations of available forms of heavy metals in polluted bottom sediments exceed similar concentrations in bottom sediments of the lakes of background territories.

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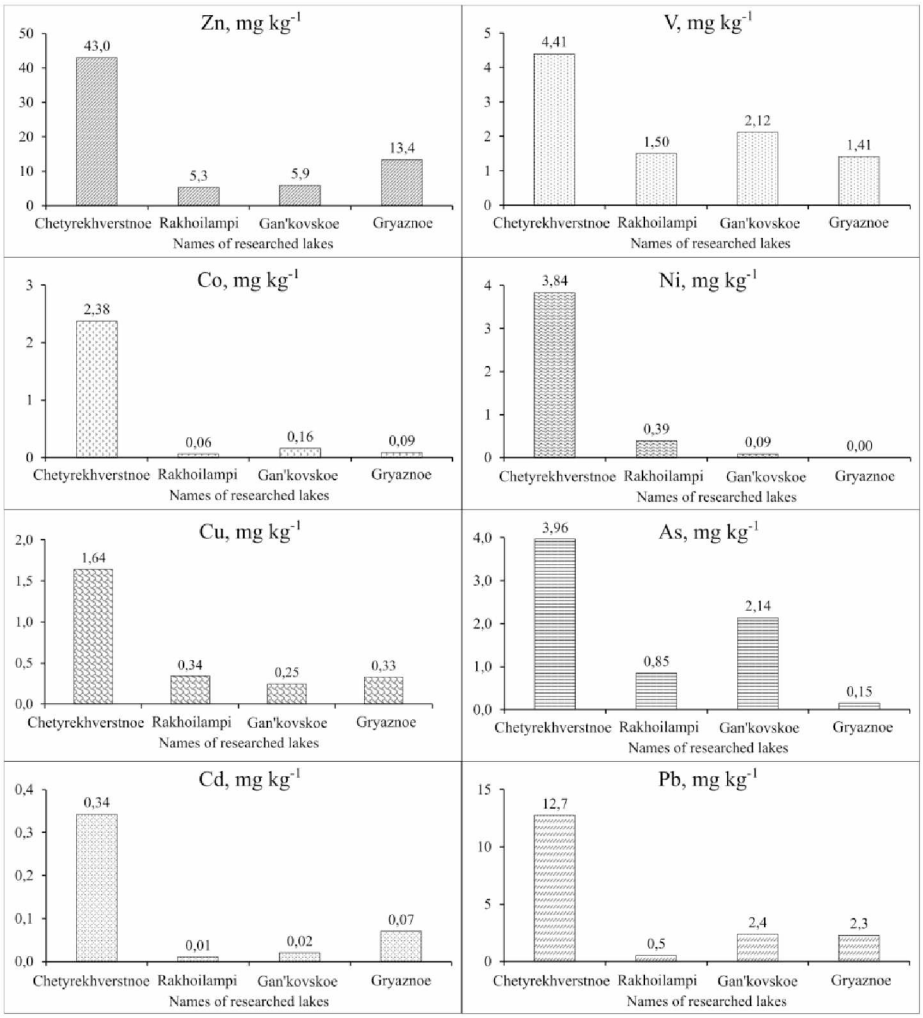

Fig. 2. Content of available forms of heavy metals in bottom sediments of the small lakes of urban and non-urban Karelia areas

AN INFLUENCE OF CLIMATE COOLING ON FLUVIAL PROCESSES - A CASE STUDY FROM OSŁONINO SITE, NORTHERN POLAND

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The Błądzikowo formation was previously established by Skompski in 1997 in the Pomorze Gdańskie region, north Poland. It is a fluvial complex deposited during the Eemian Intrerglacial and composed of channel, sandy series. It was correlated with other fluvial series of the Eemian age described from the Lower Vistula region, north Poland. Recent studies of the Błądzikowo formation from the Mrzezino key site gave a new interpreatation of it. It is older fluvial series deposited during Marine Isotope Stage (MIS) 7d under interstadial (boreal) climate conditions (Sokołowski et al., 2017).