# Transformation of the chemical composition of surface waters in the area of the exploited Lomonosov diamond deposit (NW Russia)

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The specific objective of this study was to investigate the changes in the chemical composition of river waters during the exploitation of the Lomonosov diamond deposit and the danger of these changes for the ichthyofauna. It was found that the Ca-$HCO_3$ composition of river water both upstream and downstream from the quarry was almost identical before discharge of the drainage waters into the river. In subsequent years, the water downstream from the quarry acquired a Na-$HCO_3$ composition, and then a Na-$HCO_3$-Cl composition and TDS increased by 2.5 times. In addition, concentrations of Sr, B, U, Mo, Zn, and Cr also increased. Approximately similar trends were obtained from the results of thermodynamic computer modeling. With respect to Fe, Mn, and Mo, concentrations that are above the maximum permissible concentrations (MPCs) for fishery rivers are apparent. At the same time, elevated Fe and Mn concentrations are associated with the natural composition of river water. The negative influence of drainage waters is manifested only with respect to the high concentrations of Mo. An important role in increasing Mo concentrations in drainage waters is played by the processes of hydrolysis of sodium aluminosilicates and mixing of fresh water with salt water. The concentrations of Sr, B, Ba, V, and Cr in drainage waters are higher than those in surface waters. However, they generally do not exceed the concentrations of the current MPCs. The source of Cr, Ba, Ni, and V in the drainage waters can be the products of the kimberlite magmatism. With the expansion of the quarry field to the north, a short-term but significant increase in the salinity of the drainage water is expected. The possible impacts of metals effects on fish are presented.