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ABSTRACTS

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MONITORING RESULTS ON THE QUALITY OF GROUND WATERS ON THE IVANKOVSKOYE RESERVOIR WATER COLLECTION

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Ivankovskoye reservoir is the main source of drinking water supply for Moscow (over 60%) and this fact causes the great consumers' interest to its water quality. But this is the water quality to be worried about as geoecological situation on the Ivankovskoye reservoir water collection and especially in its water protective zone remains very dangerous. Environmental complexes of the area, surface and ground waters suffer from the great anthropogenic load from point-like and diffusive contamination sources. Even decrease of the volume of drains from industrial enterprises being brought in the Ivankovskoye reservoir and water sources of Tverskaya region and decrease of mineral and organic fertilizers being brought in the soils (in 15 and 5 times respectively in the Konakovskiy region) did not result in the significant improvement of water quality due to the fact that the contaminants from the water collection and with ground waters are still delivered in the significant quantity.

Ground waters are during the whole year the constant source of the reservoir water contamination especially with nitrogen and phosphorous which helps eutrophing of the reservoir. Their being one of the main sources of contaminants delivery to the reservoir can be proved with its share in the reservoir supply created by the underground waters of the main tributaries and direct discharge of the ground water in the reservoir bed and banks.

The underground drain share in the supply of the main tributaries flowing in the Ivankovskoye reservoir (the rivers Tvertza, Shosha, Lama) according to our calculations ranges from 32 to 38% and can vary within a year from 23 to 40% depending upon the water quantity in the period. In the whole, the underground water drains in the reservoir amount to about 40% of the total volume of inflow.

The results of the ground waters monitoring on the Ivankovskoye reservoir water collection show that the ground water contamination is of local character and the main contaminants are nitrate and ammonium compositions of nitrogen ($N-NH_4$ and $N-NO_3$) and to the less degree are phosphates and chlorides (Cl) and organic compositions.

The increase of SO_4 concentrations in the ground waters is observed everywhere or this ion numbers remain on the level of the 1980s which evidences the total environment contamination and acid precipitations resulted from the atmospheric compositions brought in the atmosphere by the local enterprises and transference over the borders.

The main contaminator of the atmosphere on the water collection is Konakovo power station. In separate sections of the collection sodium and potassium concentrations increased, the amount of nitrate nitrogen is observed to decrease on the heavily fertilized plots and to increase on the plots being

strongly fertilized. On the areas with decreased or zero antropogenic loading the tendency to decrease all the main contaminants concentrations is observed.

Ground waters of the Ivankovskoye reservoir water protective zone are characterized with changeability of hydrochemical data between and within a year and their dependence on the annual water quantity and levels regime. Thus when adding fresher rain and melted water to the ground waters the content of the main macrocomponents decreases and it increases when ground waters level decreases. The content of such ions as NO_3 , NH_4 , PO_4 and slightly SO_4 increases as ground waters supply from the surface increases which is connected with the soils horizon enriched with nitrogen and phosphorous compositions washing up under the influence of agricultural activity. Especially high content of nitrate ammonium nitrogen, mineral and common phosphorous is observed on the areas belonging to poultry farms, on the personal plots of land being heavily fertilized etc.

A significant economic development of the area leads to the anthropogenic regression of the water protective zone environmental complexes influencing the intensivity of the contaminants absorbing, transforming and utilizing processes. Higher soils horizons bear greater anthropogenic pressure and are at the same time a powerful biologic filter.

Areas being economically used in different ways influence ground waters quality forming. Increase or decrease of the anthropogenic loading is observed in the increase or decrease of the contaminants concentrations in the ground waters on a certain area.

The main types of the area economic use influencing the chemical composition of soils and ground waters through the soils are agricultural fields, industrial and inhabited areas, transport ways and recreation areas.

Hayfields are the purest environmentally type of agricultural use of an area and recreation is the least dangerous for the water quality type of economic activity (provided the allowed loading is complied with and the recreation zones are duly developed).

To improve the ground waters quality in the water protective zone of the Ivankovskoye reservoir, environment protective recommendations should be complied with, i.e. prohibition of forest cut within the water protective zone, limitation of an individual construction activity, non-standard agricultural activity and prohibition of land being ploughed up to the water cut, forest planting or the shore area meadow planting etc. Ground waters quality monitoring should be held constantly, especially on those areas subjected to high antropogenic loading.