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Evolution of technogenic landscapes on the territory of Verhnekamskoye Potash Deposit

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Verhnekamskoye Potash Deposit is one of the biggest Potash deposit in the world and situated in Western Pre-Kama region. The deposit consists of carnallite, silvenite and halite beds. Salt has been produced since XV century. Two periods are observed in technogenic landscape evolution. The first period (from XV to XX centuries) was connected with rock salt (halite) production. Brine was pumped due to wells and boiling in open pans. Wastes of salt production were residue during evaporation, mainly gypsum, and high mineralized water of a Cl – Na facies. Salinization of surface water and soils was local. The impact of the salt production on the environment was insignificant. The large-scale transformation of the landscapes in Western Pre-Kama region began in the second period of field exploitation from the 30-th years of XX century, when Potash Deposit was discovered and potash mining was actively developed. The main factor that has caused to the environmental issues in the area is accumulation of potash production wastes in large amounts. The waste consists predominantly of some soluble components such as potassium and sodium chlorides and impurities. Drainage water of a Cl – Na facies, with mineralization of about 440 g/L and high content of microelements are actively involved in the surface and subsurface flows, forming a zone of salinity of soils, surface and groundwater. The most affected landscapes are located in the river valley, polluted by the technogenic flows, and near the waste storages. Increasing of concentrations of Cl and Na in soils and water caused the change of terrestrial and aquatic ecosystems on salt resistance, in some cases, up to a full distraction of the ecosystems. This project was funded by RFBR 15-05-07461.