

WATER MIGRATION OF CONTAMINANTS IN AREAS AFFECTED BY APATITE-NEPHELINE MINES

MALINOVSKY, D.N., Institute of the North Industrial Ecology Problems, Apatity, Russia.

Mining of apatite-nepheline deposits on the Kola peninsula resulted in appearance of technogenic process of migration of such elements as Al, Sr, Fe, Mn, Zn, Cr, Cd, F, P and others. Elevated concentrations of these elements entering into water systems create a risk for water organisms and a man. Study of surface and ground water, sediments and snow pack on areas affected by apatite-nepheline mines was undertaken to reveal main features of contaminant migration in water and to assess factors controlling contaminant transport. Results of the study indicate that basic processes responsible for water pollution are as follows: 1) migration of contaminants in mining water; 2) airborne transport; 3) leaching elements out from waste rocks by atmospheric water. Dominant forms of Al, Fe, Mn, Zn, Cr migration in waters affected by the mines are in composition of suspended matter and unlabile. Suspended matter in the surface water is characterized by high percentage of fine fractions (0.45-1.00mm) constituting in average 40% from the total amount that is stipulated transport of metals associated with fine fractions of suspended matter on long distances. Distribution of contaminant concentrations along surface water flow and data on accumulation of metals in sediments indicate that basic mechanism responsible for attenuation of the contaminants in the water flow is dilution by seeps and tributaries. Less importance in attenuation of Al, Fe, Mn, Sr, Cd has a process of their sorption onto bed sediments of water streams.