Air born soil pollution assessment and mitigation in the south of ukraine

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Atmospheric emissions made by mining and metallurgy industry account for 54 % of total air pollutions of the Dnipropetrovsk Region. As it has been shown previously, the range of pollutants depends on the number and types of the industrial enterprises located within the each urban area. In Dnipropetrovsk and surrounding cities the dominant emissions come from the waste of metallurgical and chemical industries, which is heavily developed in this area. The multipollution exposure assessment was made for the several cities in Dnipropetrovsk industrial region in the south of Ukraine. In this connection the monitoring of atmospheric air pollution in the environment of the Dnepropetrovsk megalopolis area was carried out in several industrial cities: Dnipropetrovsk, Dneprodzerzhynsk, Kryvyy Ryg and Pavlograd with use of the network of stationary monitoring stations at the Dnepropetrovsk Regional Center of Hydrometeorology. The initial evaluation of technogenic atmospheric pollution with toxic substances was performed with due to the limit values of so-called maximum permissible concentrations (MPC) for harmful emissions in the atmosphere as set out in the Ukrainian Air Quality Standards. The main sources of air pollution in industrial cities are stationary. Meantime increasing road transport is a growing source of pollution. The maximum excess of MPC content of NO_2 in the atmosphere of the cities has reached twice. Over the last 5 years in the atmosphere of industrial cities in the region there was an increased level of nitrogen dioxide (excess of MPC in 1, 5-2, 5 times). Number of inorganic aerosols (nitrogen dioxide, sulfur dioxide and other) has an effect of summation. In the presence of diffuse sources are superimposed individual emissions and formed the total torch actually located over the whole of the industrial agglomeration. Spatial structure of such a torch is very complicated, instant concentrations of impurities at various points in the city are substantially different. Summary torch formed over each industrial city from the merger of numerous enterprises emissions, under the influence of wind can spread in the long distances.The main sources of soil pollution in Pavlograd city and suburban territories are mine tailings, heat supply companies, operating in Western Donbass coal, other industrial enterprises and transport. The coal and mine rocks contain significant amounts of heavy metals and rare earth elements, lead, zinc, vanadium, manganese, cobalt, chromium, germanium, cerium and others. Settling on the earth's surface, they form insoluble compounds and accumulate in the upper parts of the soil cover. The detection of acid rain impact for the vast number of analyzed soil samples (95 %) were weakly acidic pH (6.3 - 6.8). As a result of consistent mapping of pollution in the city of Pavlograd six heavy metals was obtained corresponding GIS map. Follow to the analysis of the GIS map, it becomes possible to select multiple halos increased density of total soil contamination with heavy metals. The total pollution index of multipollution level of soil contamination was calculated for generalization of the obtained results. For most of the analyzed samples, according to the above gradation, the environmental situation of the contamination of soils by heavy metals is changed from "moderately threatening" to "threatening". The conception of step by step integrated approach using phytostabilization and phytoremediation measures has been completed. Some rocks as sorbents for detoxification of contaminated soils with heavy metals were studied. The coefficients of heavy metals accumulation for some crops were established in model experiments.