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Abandoned agricultural soils from the central part of the Yamal region

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The post-anthropogenic and soil cover transformations of former agricultural soils on the abandoned lands in the Russian Arctic territory are poorly investigated due to the active growth of the city complex and increasing area occupied by agricultural lands. That is lead to an increase in the area of the arable lands surrounding the polar urbanized territories. Today, most of that land allocated for agricultural needs has been abandoned or affected by other types of land use. This study aimed to investigate the abandoned lands surrounding some of the settlements in the central part of the Yamal region. The soil diversity, morphology, and chemical and agrochemical properties were investigated with special reference to the specific transformations that occur to fallow lands under permafrost-affected cryogenic-ecosystem conditions. Analysis of data show that these soils are characterized by features relating to both, previous (and existing), anthropogenic impacts and to natural processes such as cryogenic mass transfer. Based on the analysis of agrochemical properties and features of soil formation in Salekhard city and its surroundings it can be concluded that: (1) The predominance of sandy textured parent materials in the surroundings of the urbanized territories in the central Yamal region was the key reason why these locations and substrata were chosen for the organization of agricultural farms and related practices. Due to the prevalence of clayey textured parent material across the main territories of the Yamal region, agricultural practices were based on using the arable lands and are strongly localized on quaternary sands. (2) The key nutrient content in the fine earth fraction (i.e., nitrogen and potassium in the soils) can serve not only to assess soil fertility, but also reflects current changes resulting from anthropogenic impacts on the urban ecosystems. Most soil samples showed high nutrient levels. However, in some cases, a relatively high nutrient content was also found in the lower horizons, with a large amount of Al and Fe hydroxides. (3) Due to the post-agrogenic transformation of the agropodzols, the upper horizons of the profile are acidified, which has led to increased eluvial removal (leaching) of materials, yet it still shows a clear arable horizon two decades after the last agricultural use of the soil. In the future, the intensity of the eluvial processes will increase, which after 60 years can lead to a complete degradation of the arable horizon. A superimposed type of postagrogenic evolution then begins. with the formation of a complex soil profile that combines the characteristics of the natural original soil, agropodzol, and a secondary podzol, which develops on top of the agropodzol.

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