

THE ADVANTAGES OF THE MODERN CLASSIFICATION OF THE SOILS OF RUSSIA WHILE CONDUCTING THE SOIL RESEARCHES IN THE INDUSTRIAL ZONE OF THE MINING COMPLEX

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Abstract

The mapping of soils in the industrial zone of mining complex on the basis of two soil classifications: factor-genetic and substantive-genetic was conducted. On application of the modern classification the number of areas is accrued due to the increasing of the allocated rocks diversity and detailing of the soils changes behavior under the influence of human activities.

Keywords

KMA, mining complex, soil classification, agroc Chernozem, technochernozem, chernozem, naturefabricat, stratozem.

Introduction

Nowadays the industrial potential of the Belgorod region is largely determined by the mining and iron ore processing. In 2012 extraction of iron ore by the mining companies of the region amounted to 88.6 million tons [1]. For evaluation of the current state and prediction of the possible change of the natural environment under the influence of anthropogenic forcing the ecological engineering surveys are conducted, the parts of them are soil researches with the soils passport formation. The problem is to classify soils, which often have undergone substantial anthropogenic impact. Some aspects of the problem were discussed by us previously [2, 3].

In the proposed article the advantages of the modern classification of Russian soils in the process of the mapping of soil cover suffering by technogenic load are discussed. Until recently, soil mapping in our country, including the large-scale one, was conducted on the basis of classification systems constructed on a factor-genetic basis. [4]. This approach responds to the traditional view of domestic soil science of rigid deterministic relationship of the factors, processes and properties of soils. At present the introduction of substantive-genetic soil classification system is taken place [5].

The first edition of this classification, appeared in 1997, then it was complemented and deepened in publications 2004 and 2008 years [5;6]. Its theoretical basis is the doctrine of soils genesis and neo Dokuchaev triad «factors - processes - properties», i.e. the soils diagnostics are based on the quality characteristics of the profile structure. The important achievement of the new classification is the review and systematization of new soil (the anthropogenic-transformed) and not soils formations. However, for various objective and subjective reasons the new substantive-genetic soil classification does not find a full recognition among soil scientists [7].

The purpose of our research was the soil mapping of the impact zone by the dumps of mining complex on the basis of traditional [8] and a new classification of soils of Russia [5] and

comparison of theirself-descriptiveness. The research was conducted in the framework of engineering and environmental surveys.

Materials and methods

Mapping of soil cover was held in 2013 at the territory of the Gubkinsky district. During the field survey full soil cuts, dripping holes and wells were used. Their morphological description was conducted and the name of soils based on both classification systems was given

Results and their discussion

The figure presents the skeleton maps composed by us. Variant A reflects the situation within the classification of 1977. 4 different areas, among which the chernozem typical lightly washed and the output rocks an outcrop of rock were revealed. In the beam systems of the area the chernozem typical middle washed out on the slopes of hills and the sod washed up on the bottoms are presented

Variant B is built on the basis of classification of 2004. Here 6 soil areas were revealed, among them the agrochernozem overdense and chemozem are prevailed. Dumps of the career are presented by naturefabricat-litostrates. In the western part of the area technochernozem and agrochernozem were described. The slopes of hills are covered with chernozem migratory-micellar and bottoms - stratozem dark humus.

The alternative approach to the name of the soils using Latin roots is obvious. In the opinion of V.F. Valkova and others [9], this experience should be considered as successful for the first time entered soils, especially for anthropogenically transformed and man-made surface formations. At the same time, many questions concerning the application of the new classification of soils occur in soil scientists, working in the chernozem area. In particular, problems of allocation of different types of chernozems seem debatable. Earlier only a single type of chernozem was allocated, and now chernozems clay-illuvial, chernozems, chernozems textural-carbonate are defined.

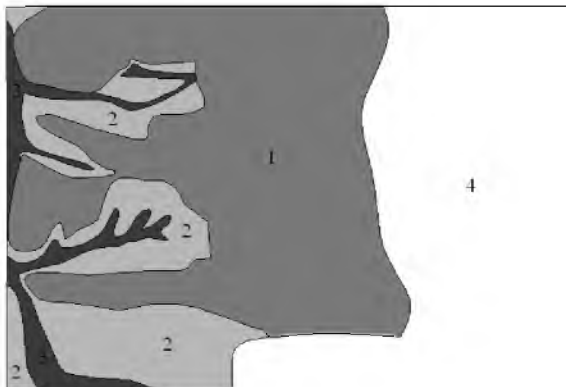


Fig. 1: Sceleton map A

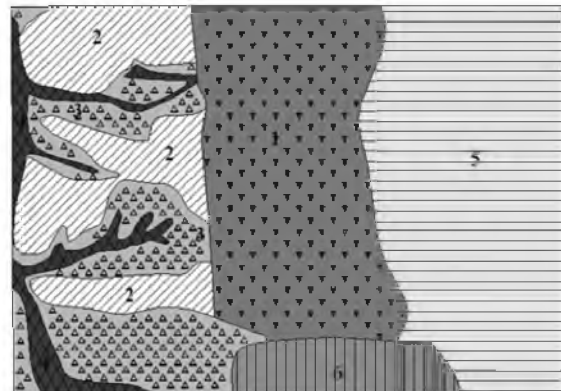












Fig. 2: Sceleton map B

Table 1: Legend of soils skeleton maps

№ area	Color	The name of the soil (combination of soils)
Skeleton map A		
1.		Chernozem typical lightly washed out on loess loam
2.		Chernozem typical middle washed out on loess loam
3.		Sod washed up on talus silt
4.		Output rocks
Skeleton map B		
1.		Agrochernozem overdense on loess loam
2.		Complex of technochernozems and agrochernozems on loess loam
3.		Chernozem migratory-micellar middling small on loess loam
4.		Stratozem dark humus water-accumulative
5.		Khemozem
6.		Naturefabricat-litostrat

Agrochernozems stand out in the new classification on the type level and are diagnosed by the presence of agrohumus horizon in the profile, which is formed in the upper part of the humus horizon of natural soils as a result of natural phytocenoses replacement by the cultivated plants [5].

Khemozem - a general name of all soils and surface formations that are highly chemically polluted. Over the investigated area they develop on the territory of the former tailings. Naturefabricats - the formations which are deprived humus layer and consist of mineral, organic and organo-mineral material of natural origin. In the survey area, they are represented by litostrat - bulk mineral soils blade overburden mining enterprise [5].

The technogenic soils, characterized by partial or complete mechanical violation of their profile are formed under the influence of industrial activity. They can be combined with not soil formations - the areas of technogenic and natural coats [10]. The technochernozems described by us belong to the «techno-soil» and characterized by a violation of the upper part of the soil profile due to mixing of technogenic material from the source of genetic horizons. On the slopes of hills the chernozems migratory-micellar are developed, they are characterized by presence of the dark humus accumulative carbonate horizons and carbonate forms of new formations in the form of «pseudomycelium». If to compare considered classifications, these soils are close to the chernozems typical.

Stratozems belong to sinlithogene soils, in which the soil formation is passing simultaneously with accumulation of mineral material. Their profile consists of the dark humus and stratified horizons. Subtype «water-accumulative» indicates the mechanism of formation of such soil due to water erosion [5]. In classification [8] they were not classed as soils, but as soil-grounds. Thus, sod alluvial soils occupy a certain position in the modern classification of the soils of Russia.

It can be argued that the use of modern substantive-genetic soil classification system has obvious advantages for mapping of territories where the anthropogenically transformed soils and soil like bodies are prevailed. Skeleton map in this case shows us the specificity of the occurring of the output of rocks and also details the nature of changes in soils under the

influence of human activity. In this connection the increasing of the allocated areas numbers is taken place.

Thus, the actual problem is the status of the new classification. The adoption of this standard would successfully carry out contractual works, where appropriate references to official document are required. As noted by M.I. Gerasimova and S.F. Khokhlov [11] in Russia there is no the relevant organization which could take a formal decision. All-Russian Congress of soil scientists of 2008, which has approved the classification, has no such rights.

Conclusion. Mapping of soils in the industrial zone of mining complex showed that the application of modern substantive-genetic classification leads to the growing number of areas by increasing the diversity of allocated rocks and detail of the changes in the soils under influence of human activity.

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