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Geology as the Science of the Earth and its connection with the Soil Science and Science of the Agrochemistry

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Abstract.
The research was conducting with the aim of studying the geological structure and geological history of the earth's surface as a whole or a separate territory, which makes it possible to correctly understand the genesis of soils and soil cover, the spatial differentiation of soils.

Keywords:
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AGROTECHNOLOGIES AND AGRICULTURAL INDUSTRY

Geology is the fundamental science of the geological cycle, which unites a whole family of related sciences dealing with the study of the structure, material composition and history of the formation of the Earth - one of the eight planets of the Solar System. The earth is also studied by many other sciences, such as astronomy, geography, geodesy, geomorphology, but geology, unlike them, studies, first, geodynamic processes that take place in its interior or on the surface, because of which minerals and rocks are forming, which make up the lithosphere of our planet's crust [1].

Geology has a close connection with the sciences of the biological (including agricultural) cycle, in particular, soil science and agrochemistry. Modern soil science developed from geology and is still methodically and methodologically connecting with it. The founder of genetic soil science, V. V. Dokuchaievym, in defining the concept of soil, noted that some internal or external horizons of rocks are significantly changing under the influence of water, air, living and dead organisms. One of the five natural factors of soil formation, according to V. V. Dokuchaiev, is the soil forming or parent rock, from which the soil inherits a number of the most important properties that determine its fertility to a certain extent [2].

Highly dispersed minerals of the montmorillonite group (halosite, beidelite, montmorillonite), which are parts of clays, play a special role in creating soil fertility. They are a component of the most active part of the soil - colloids. Such properties of the soil as absorption capacity, providing plants with water and nutrients are associated with highly dispersed minerals. Physical and mechanical properties of the soil are closely relating to them: swelling, stickiness, cohesiveness, hydrophilicity, reaction of the soil solution, granulometric composition. These minerals have a certain influence on the formation of water-resistant structural aggregates. The water, air and thermal regimes of the soil are also relating to the mineral composition.

The study of the geological structure and geological history of the earth's surface in general or a separate area makes it possible to correctly understand the genesis of soils and soil cover and the spatial differentiation of soils.

AGROTECHNOLOGIES AND AGRICULTURAL INDUSTRY

The importance of geological knowledge for students and specialists lies in the detailed study of the mineralogical composition of soils, as well as for the survey of the soil cover of the farm and the compilation of soil maps and the development of scientifically based measures and methods for the rational use of the soils, in order to preserve and increase their fertility [3-4].

A number of rocks and minerals are important for agriculture, as agronomic ores, that is, they are using in agricultural production as fertilizers, chemical land reclamation agents or are raw materials for their production. The most important are agro-ores, which contain the main elements of mineral nutrition of plants: nitrogen, phosphorus and potassium. They are directly using by plants and are called direct. Ores that contribute to the improvement of physical, physics-chemical and agrochemical properties of soils are calling secondary. These include chemical meliorants: limestone and gypsum. In agriculture, in addition to agro-ores containing the main nutrients, rocks and minerals are used, which also include other macro (C, Mg, Ca, S, Fe) and microelements (B Mn Cu Zn Mo Co) [5 -6].

The information that geology as a science can provide facilitates the development of ecological projects for the organization of the territory of newly formed agricultural enterprises, which must necessarily be based on the strategy of soil protection against chemo genic pollution and degradation; projects of anti-deflation and anti-erosion protection of soils, their reclamation (drainage, desalination, irrigation); construction of ponds, wells. Laying wells in search of local construction, agronomic and other materials and ores [3-5].

Economic, monetary and ecological assessment of land in the land cadaster is impossible without geological justification.

Therefore, the connection of geology with soil science, agrochemistry and other agricultural sciences is of great importance in the development of agricultural production in Ukraine.

References:

[1] Geology with the basics of mineralogy: a textbook / P. V. Zaritskyi,

D. H. Tykhonenko, M. O. Horin, V. V. Andrieiev, V. V. Dehtiarov, editors. P. V. Zaritskyi, D. H. Tykhonenko, editor-compiler M. O. Horin, - Kharkiv: Maidan. 2012. 584 p.

[2] Geology with the basics of mineralogy: a study guide / D. H. Tykhonenko, V. V. Dehtiarov, M. A. Shchukovskyi, A. H. Yazykova and others, edited by D. H. Tykhonenka. Kyiv: Higher Education. 2003. 287 p.

[3] Hnatenko O.F., Kapshtyk M. V., Petrenko L. R., Savitskyi S. V. Soil science with the basics of geology: textbook. Kyiv: Oranta. 2005. P.1-184.

[4] Liakhov Yu. V. Geology of minerals: a textbook. Part 1: Oreogenesis / Yu. V. Liakhov, M. M. Pavlun, S. I. Tsikhon. Lviv: LNU named after I. Franka, 2012. 286 p.

[5] Soil protection and reproduction of their fertility: a study guide / V. O. Zabaluyev and others. Kharkiv: Styl-izdat, 2017. 348 p.

[6] Hospodarenko H. M.Agrochemistry: textbook. Kyiv: SIK GROUP UKRAINE LLC, 2019. 560 p.