

1. Introduction

This report analyzes the possibility of coordinating the areas of genetic types and varieties of soil cover in the intensively developed region of the Northern Black Sea Region with taxonomy of geomorphological zoning, with morphogenetic categories of the relief of the earth's surface, with separate topographical and genetically homogeneous surfaces, with simple and complex surfaces of various morphologies, exposures, morphometric indicators (vertical and horizontal dismemberment, steepness of the slopes). The relevance of this approach is important and timely, given the presence of a number of problems in the Ukrainian economy [1].

As a result of the analysis of theoretical and methodological concepts [2, 3], an algorithm for the ecological and geomorphological analysis of the formation, use and degradation of the soil cover in the central part of the Northern Black Sea Region is developed based on the philosophical vision of scientific knowledge (Fig. 1).

A step-by-step consideration is given on the example of the investigated territory, versatile cartographic information selected and considered in the context of the topic of the report, its analysis in combination with the properties of the soil cover of the region.

RELIEF AND SOIL COVER OF THE NORTHERN BLACK SEA REGION: ECOLOGICAL AND GEOMORPHOLOGICAL ASPECT

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Abstract: The possibilities of mutual dependence of the areas of genetic types and varieties of the soil cover of the intensively developed region of the Northern Black Sea Coast with taxonomy of geomorphologic zoning, with morphogenetic categories of the relief of the earth's surface, with separate topographical and genetically homogeneous surfaces, with simple and complex surfaces of different morphology, exposition, morphometric parameters (vertical and horizontal dismemberment, steepness of the slopes) are considered and analyzed.

The relevance of this approach is important and timely, given the presence of a number of problems in the Ukrainian economy. The study is carried out both in the territory of the regions a whole and in key areas, which in general represent the most revealing features of orographic, geomorphologic and paleogeographic character, distribution and quality of soil cover.

Thanks to the analysis of the theoretical and methodological representations, an algorithm for the ecological and geomorphological analysis of the formation is used and degradation of the soil cover in the central part of the Northern Black Sea Coast is developed, based on the provisions of the philosophical vision of scientific knowledge.

This report presents a step-by-step consideration, based on the example of the investigated territory, the diverse cartographic information chosen and analyzed in the context of the message topic, in conjunction with the properties of the soil cover of the region.

Keywords: geomorphological zoning, soil categories, analysis of cartographic materials, genetic types of soil cover.

2. Methods

Analysis of small-scale cartographic materials indicates only general patterns of the relationship between the relief of the Earth's surface and the main ("background") varieties of the soil cover of the region [4-7]. Not detailing in the text of its content, since its results only indicate some forms of dependence of the spread of the soil cover from geomorphological, geological, paleogeographic features, it is advisable to focus on the results of analysis of large-scale cartographic materials of geomorphological and pedological character [8, 9].

3. Results

For the analysis of cartographic materials of large scales, it is advisable to operate with the concept of "catena", which makes it possible to establish the relationship of soils with relief due to the arrangement of genetically homogeneous surfaces and their slope, which determines the intensity of "drainage" of surface waters and, thus, determines the water regime of soils and the dynamics of geomorphological processes. Proceeding from the fact that the catena is a natural construction of groupings of different soils united in their formation, development and distribution by certain features of the relief of the earth's surface and the processes of its formation.

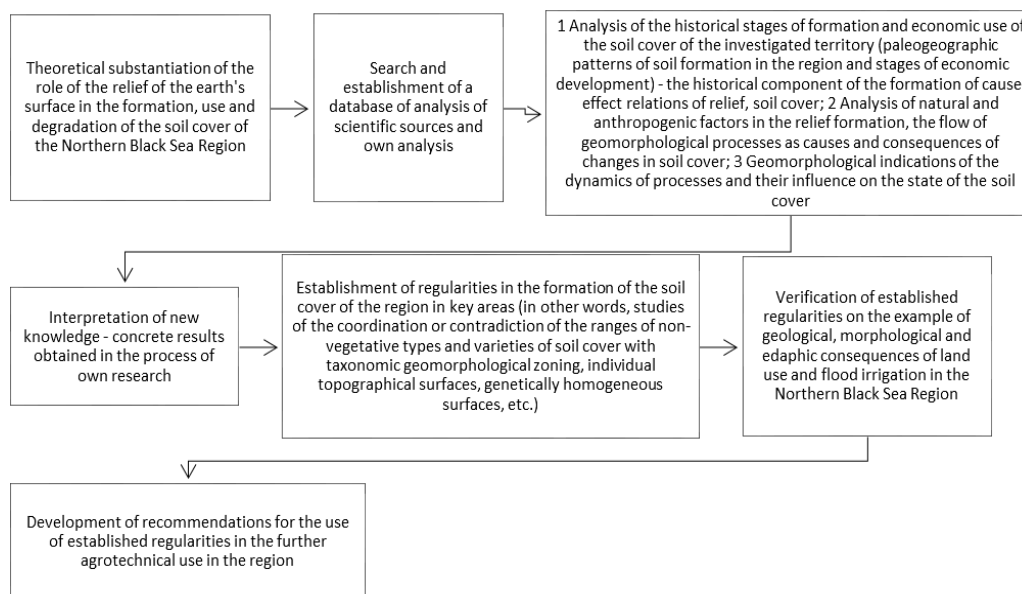


Fig. 1. Algorithm of ecological and geomorphological analysis of the formation, use and degradation of soil cover in the central part of the Northern Black Sea Region

And regularly repeat in similar characteristics of the relief, further analysis is aimed at finding similar morphological and morphometric characteristics of relief of the investigated territory, which are also included in the concept of "catena". To do this, these studies are focused on the key areas of the Northern Black Sea Region, where most likely there are conditions for the existence of subterranean catenae [6, 10]. The interfluves and adjoining slopes and bottoms of river valleys and estuaries were chosen as such because they have all the prerequisites to contain genetically homogeneous surfaces (interfluve surfaces and slopes and bottoms) formed by a definite geomorphological process and characterized by a certain similarity of geomorphological conditions and the geological structure of the upper part of the geological section, as well as microclimatic features

The key areas cover the following interfluves (within the topographic maps of the scale 1:100 000): I – Cogylnyk-Sarata-Hadjider and the part of the Danube-Cogylnyk interfluve adjoining the Cogylnyk; II – parts of the interfluve adjoining from the right and left sides to the Dniester and the Dniester estuary; III – Hadzhybey-Kuyalnik interfluve, adjoining part of the Sukhoy Liman-Hadzhibey interfluve and part of the Tiligul-Kuyalnik interfluve adjoining the Kuyalnik; IV – Tiligul-Berezan-Southern Bug (Bug estuary) interfluve; V – Southern Bug-Ingulets interfluve; VI – Dnieper-Molochnaya interfluve within the vicinity of Novaya Mayachka, Chaplynka and NovoTroitsk [9]. The research is carried out in key areas, which in general represent the most revealing features of orographic and geomorphological character, and also cover the interfluve of the investigated territory, characterized by different energy of the relief (areas with different vertical and horizontal dismemberment indices), this determines the potential of modern geomorphological processes involved in genesis and transformation of the soil cover of the region.

Establishment of the environmental hazard manifestations associated with the progress of modern natural and anthropogenic geomorphological processes is the task of the actual environmental and geomorphological research. Each of these manifestations of unfavorable development of processes and phenomena can be fixed and evaluated by means of geomorphological methods. It is done in the presented work.

4. Discussion

According to the research results, the territory of the Northern Black Sea Region is characterized by the following processes and phenomena, based on both natural and anthropogenic factors: deterioration of the quality of agricultural land due to the development of planar and linear erosion within certain catenae; the distribution of relief forms associated with subsidence loess strata (old and modern), which cause the formation of pods and steppe saucers, including – due to additional irrigation systems; flooding and dehumidification of surrounding areas in the zones of influence of numerous estuaries and primitive reservoirs (ponds), as a result of which processes of salinity and solodization are activated; pollution of agricultural lands in areas adjacent to roads and chemical industry enterprises; deterioration of aesthetic properties of the relief in particular and landscapes, in general; the newest processes associated with the open development of mineral raw materials (primarily the quarries of building materials) the creation of the newest aesthetically attractive landscapes; the development of aeolian processes on the sites of the construction of forest tracts.

In the analysis of small-scale maps of the Northern Black Sea Region, the complete coordination of the latitudinal zonality of the main soil differences of the region with the strike

and, in part, the contours of the Black Sea depression is traced, which indicates the paleogeographic trends of its geological development and the accumulation within its boundaries of the transgressive deposition of sedimentary complexes, of which the youngest – soil of forest formation – served as a soil forming rock. It is true that the differences in the tectonic regime of the Black Sea depression caused corresponding differences in the formation of a generally flat relief, represented by a denudation straggly plain on Neogene sediments (Danube-South Bug interfluve, N₂-P) and a denudational subhorizontal flatland on Neogene sediments (Southern Bug-Dnipro-Molochna interfluve, N₂-P). However, the common plain territories, monotony of the upper part of the geological section, similar climatic conditions formed the basis for the formation of zonal features of the soil cover. Thus, the differences in the distribution of the forms of relief of various genesis, the paleogeographic conditions for their formation, local differences in the geological structure and the presence of transit valleys through the ground zones have led to the formation of variegated soil cover, the analysis of which is presented below.

To do this, further analysis of regularities in the relations of origin, formation and transformation of the soil cover with known and established geomorphological, geological and paleogeographic factors is carried out on the example of 6 key areas covering certain parts of the Northern Black Sea Region in the volume of 2 to 3 sheets of topographic maps of scale 1:100,000 each. The features of the relief of the earth's surface and the spread and intensity of modern geomorphological processes are established during the analysis of the engineering and geomorphological map of the Northern Black Sea Region, and the patterns of spread of soil differences and data about denuded soils obtained from the analysis of soil maps of Ukraine of scale 1:200 000 [8].

The ecological and geomorphological aspect of the relations between the relief and the soil cover of the investigated region of the Northern Black Sea Region consists in the following provisions:

- about the features of the soil cover formation, then there is a regular latitudinal distribution of the main differences in background soils, which on the whole repeats the outlines of the Black Sea lowland. Some violations of the latitudinal configuration of the boundaries of background soils (common black chernozems, chernozems of southern and dark chestnut soils) occur in the interfluvial areas adjacent to the large transit river valleys – the Dniester, the Southern Bug, the Dnipro, and also on the right bank of the valley of the Molochna river;

- the influence of the relief of the earth's surface on the features of the formation, propagation, use and degradation of the soil cover is to the greatest extent carried out in accordance with the data of the geological structure, paleogeographic environments of accumulation of soil-forming rocks, in places, in accordance with morphostructural features (structural terraces of the Pontic limestone complex) and certain features surface areas of discharge of the first aquifer from the surface;

- spreading of flat flushing processes with a high degree of correlation and, accordingly, weak-, medium- and strongly denuded soils is traced on almost all slopes with a steepness, ranging from 3–5°;

- significant anomalies in the species composition of the soil cover are inherent in the river valleys and large creeks, in the bottoms of which, due to the meridional direction, the soils of varying degrees of salinity and humidification are gradually replacing each other. Among other factors of the indicated variegation of the soil cover, a certain role belongs to paleo-

graphical conditions, namely, to the repeated ingression of the sea basin into the wide graded valleys;

– originality and variegation of the soil cover of key site VI. (“Dnipro – Molochna interfluve”) is due to the complex paleogeographic history of the formation of soil-forming rocks, where the processes of transgressions and regressions took place (the accumulation of a complex sedimentary strata), the accumulation of loessial rocks and their repeated changes in the conditions of the tundra steppe of climatic minima and the influence of significant migration of the Dnipro valley in its wellhead;

– large creeks distributed on the main interfluve of the investigated territory had a significant influence on the formation of soil cover due to different exposure of their slopes, significant changes in microclimatic parameters and species composition of plant formations and caused corresponding deformations of the boundaries of the main soil differences in the region;

– the location of the pedological intermediate between ordinary chernozems and dark chestnut soils is due to climatic factors, however, the complex boundaries of these soils have a

distinct imprint of heterogeneity of the morphological and morphometric parameters of the earth’s surface and its influence on the spread of various plant associations.

So, the main components of the ecological and geomorphological analysis:

a) analysis of the factors shaping the relief of the earth’s surface;

b) establishment of genetic types and boundaries of unfavorable geomorphological processes;

c) the correlation of morphological and morphometric data with the quality of the soil cover, caused by the effect of plane flushing and, in part, linear erosion;

d) the differences of key areas suitable for establishing the relations of relief and soil cover at the local level;

e) an illustration of the history of the agricultural use of the investigated territory and the tracking of the intensity of economic activity that can affect the quality of the soil cover are realized in accordance with the theoretical and methodological provisions developed to date.

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