



The carbonate state in arable and abandoned soils of the south of the forest-steppe zone of Central Russian Upland (forest reserve site "Les-na-Vorskla")

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With the agricultural use of soils, the modes of their functioning change. This causes a transformation of their composition and properties. Dehumification, compaction, acidification (decalcification), carbonatization, alkalization can occur in the soils (Phaeozems and Chernozems) of the southern part of the forest-steppe zone of Central Russian Upland. Pedogenic carbon in humus and carbonates undergoes changes. The aim of the research was to study of changes in the properties of arable and abandoned soils in comparison with virgin Phaeozems of the forest-steppe zone. Particular attention is paid to their carbonate state.

The objects of the study are the soils of the "Belogorye" reserve of the "Les-na-Vorskla" site.

The properties of soils were studied with the help of a field morphological description of soil profiles, micro-morphological study of samples, determination of the density of soils, organic carbon content, carbon content of carbonates, calculation of their reserves, grain size composition, radiocarbon dating of carbonates from the upper depth of their detection. Analysis of the results showed that arable soil differ from virgin soil by a number of morphological properties of the arable horizon (compaction, layered structure, enrichment with a silt fraction); change of complex of clay skins with and in the sub-eluvial and texture horizons (the appearance of clearly expressed in the sub-eluvial horizon and the absence of ferruginous-humus-clay skins in the texture horizon); displacement of traces of activity of large animals and soil mesofauna from humus and sub-eluvial horizons (in virgin soil) into texture horizons up to the horizon BCt (in arable soil); lesser depth of appearance of carbonates and their higher age.

Many properties of abandoned and arable soils are similar, especially in the arable horizon, but when abandonment arable soils and overgrowing arable land, the soil regimes and, after them, the soil properties gradually return to their original state. There is decompression of arable horizons, gradual accumulation of organic carbon in the upper part of the profile, leaching of carbonates. The reserves of carbonates are still much higher than in virgin soil, but the equalization of the radiocarbon age of carbonates in the investigated hronosequence clearly indicates the processes of their recrystallization, leaching that have begun.

The main role in changing the arable Phaeozems in the state of the deposit is played by vegetation, which affects the redistribution of moisture, the accumulation of organic and carbonate carbon, and the density and processes of transformation of the structure of former arable horizons.