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Magnetic properties of the chernozems of the different agroclimatic Ukraine zones

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Chernozems are one of the greatest value of Ukraine. They cover the most part of the Ukraine productive plough-land. Chernozems are one of the most prolific soil types. Finally, they cover territoties, which are very important in connection with their geological value (deposits of the ore minerals, non-metallic minerals and fuel minerals of Ukraine). Besides, great attention is now given to the ecological investigations of the polluted areas and most of these territories of Ukraine are situated on the chernozems soils.

The magnetic methods of the soil studies have become very popular all over the world and our investigations show its information density in Ukraine too. The present paper outline the basic mechanism of the distribution of the magnetic parameters in different types of Ukrainian chernozems.

All chernozem tipes are relative to some agroclimatic Ukraine zones. Chernozem is not characteristic soil for Ukraine Woodland. But *leached chernozems* occur on the loess islands of this zone. On the territory of Forest-steppe the *tipical chernozems* are spread. They are zonal soils for Forest-steppe. Similarly, *usual chernozems* are zonal soils for Ukraine Steppe. And *south chernozems* cover large areas of Dry Steppe. These chernozems are transitional to chestnut soils, which are zonal soils for Ukraine Dry Steppe.

For magnetic analyses of the chernozems we use different parameters of magnetic researches and the main ones are as follows: magnetic susceptibility MS (or induced magnetization Ji), natural remanent magnetization (Jn (NRM)), summary magnetization (J_Σ) (vectorial sum natural remanent magnetization and induced magnetization), the vertical gradient of the magnetic field. The magnetic parameters were measured

under the laboratory and natural conditions with the astatic magnetometer LAM-24, rock-generator JR-4, cappabridge KLY-2, dual frequency magnetometer MS-2 and special magnetic gradiometer.

The follouing results have been obtained. The most magnetic chernozems are south chernozems of Dry Steppe. The summary magnetization of their humus horizons is close to 100*10^{-3} A/m and the parent rock is around 30*10^{-3} A/m. These soils can create an anomalous magnetic field close to 10-15 nT. Usual chernozems of Ukraine Steppe are rather magnetic too. The summary magnetization of their humus horizons is 60-85*10^{-3} A/m and parent rock is 20-30*10^{-3} A/m. A large area of Forest-steppe is covered with tipical chernozems.This soils were investigated by us the most detailed. Some of them are quite various because of geomorphology and another factors of the examined territories. The summary magnetization of their humus horizons changes in spacious range 30-60*10^{-3} A/m. Likewise for parent rock it is 5-20*10^{-3} A/m. Tipical chernozems can create an anomalous magnetic field close to 5-7 nT. Finally, leached chernozems of Ukraine Woodland are little magnetic and seldom met. The summary magnetization of their humus horizons is only 25-35*10^{-3} A/m and parent rock is 3-5*10^{-3} A/m, which values belong to non-magnetic soil types such as swamp soil, meadow soil, soddy-podzolic soil of this territory. Further, it was found that magnetic susceptibility usually falls with the depth in chernozems, but the cases of not-monotonic tendency of changes are known to us, too. There are MS increases in some genetical horizons of the soil pit. Such situations are known for south chernozems. Also, it was determined that the contribution of the remanent magnetization is higher in chernozems of Dry Steppe and Steppe of Ukraine than in other agroclimatic zones of Ukraine.

It is concluded that the changes in the magnetic properties of chernozems mainly depend on the climatic conditions of the agroclimatic zone of Ukraine. Besides, they depend on variable behavior of the mineralogical processes, soil aeration, geomorphology conditions of the agroclimatic zone. Finally, it is important to take into account lithogeneous origin of some materials in the soils and the possibility of antropogenic pollutions of the investigated areas. The problem of the ecological monitoring of the pedosphere is the most intricate in the South and in the East of Ukraine due to high magnetization of the soil cover of these areas and technogenic polluted territories of large megapolyses located there.