



Trends in mineralogical composition changes in upper horizons of postagrogenic soils.

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Due to large areas of abandoned land in Russia, it is necessary to identify indicators that allow to determine evolutionary direction of properties and composition of post-agrogenic soils. This is necessary for the rational use of abandoned areas. One of these indicators is the mineralogical composition of fraction $<1\mu\text{m}$, which define the stocks of plant nutrients and a number of physical properties and soil fertility.

The aim of the study is to identify changes in mineralogical composition of the upper horizons of postagrogenic soils.

We've selected two plant communities in the South of the Arkhangelsk region, Russia (middle taiga zone) which are at different stages of succession: young (18-years old) and old spruce forests (70-years old). Both soil profiles are characterized by the presence of morphological features of the arable horizon. Sub-horizons of arable part were identified for more detailed study.

To separate <1 micron (clay) fractions samples were rubbed into a thick paste and sedimented. Oriented preparations of fractions were examined by XRD method.

The clay fraction of the studied sub-horizons is represented by the following components: mixed-layer formation, trioctahedral illite, chlorite and kaolinite. There is a high amount of fine quartz and small admixture of K-feldspar and plagioclase.

Under old spruce forest the content of clay fraction in the micro-profile of the upper horizon does not change with depth (4.0%). Mixed-layer minerals dominate both in the fraction (49%-56%) and in the soil (2.0-2.3%) in samples from all depths. There is a relative increase in the content of mixed-layer minerals in the fraction to the bottom of micro-profile. The content of illite and kaolinite slightly decreases to the lower part of profile. The amount of mixed-layer minerals and illite in the upper part is higher than in the lower part recalculating to the whole soil sample.

Content of clay fraction under young spruce forest is higher (6.3-7.2%) comparing to the old forest profile. The amount of clay is slightly reduced towards the bottom of the microprofile. Mixed-layer minerals are also dominant (50-57%). Distribution of minerals in the fraction is different: the amount of mixed-layer minerals in the upper part of the profile is higher than in the lower part what corresponds to fraction distribution. Content of kaolinite increases to the bottom, while chlorite does not change significantly. The highest amount of illite is observed at a depth of 10-15 cm.

Both microprofiles under spruce forests are homogeneous, what does not allow to differentiate the sub-horizons on the macromorphological level. Podzolic process under 70-years spruce forest led to a bleaching of the upper horizon and to a light grain size distribution. There are trends in changing the mineralogical composition in the young spruce forest. The destruction of some minerals is at the initial stage, as can be seen on the XRD patterns of the clay fraction. The crystallinity of minerals is improving to the bottom of the micro-profile (based on the shape of the peaks).