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Humus in some soils from Western Antarctica

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Soils of Antarctica are well known as a thick profile soils with low amounts of humus concentrated in the upper layers – O or A horizons. Also there are specific soils of seashore landscapes which affected by penguins guano accumulation and, therefore characterized by high stocks of organic matter in solum. These two types of soils were studied during the Western Antarctica part of 53th Russian Antarctic Expedition in 2008 International Polar Year. These rote of expedition was on Polar stations “Russkaya”, “Leningradskaya” and “Bellinsgausen” and also two places, not affected by polar men’s – Lindsey Island and Hudson mountains (Ross Sea).

Typical soils of “Russkaya” and “Leningradskaya” stations was a Cryosoils with low humus content (0,02 – 0,20 %) which was a product of lichens decaying and further humification. The humus profile was not deep and humic substances migration stopped on the 30 cm deeps maximally. Soils of Sub-Antarctica (Bellinsgausen station, King-George Island) show higher portions of humus which maximum was 3,00 % under the mosses. Humus distribution was more gradual through profile due to the higher thickness of active layer and longer period of biological activity.

Soils under the penguin’s beaches shows big portions of organic matter, in some cases more than 50 % to total soil mass. Humification starts in first years in cases of Sub-Antarctic guano soils and only after 3-7 years of leaching in seashore Antarctic guano-soils. Soils under the guano layers were extremely reached by nitrogen, and in some cases there were not any plants there due to toxicity of guano. This event was more typical for cold seashore soils of Antarctica.

In all cases humus consists mostly of fulvic acids and low molecular non-specific organic acids. The CHA/CFA ratio in all cases were lesser than 1,0 and in more that 50 % of cases it was lesser than 0,5.

The investigations conducted shows that the stocks of humus in soil of Antarctica are not estimated and till now we didn’t know the total stocks of organic matter in automorphous dry plains and valleys and seashore landscapes of this continent.