AN EXAMPLE OF MODERN AQUAGENIC MANGANESE ORE FORMATION

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The object of our research was a typical soil-alluvial profile with several manganese-hydroxide-bearing horizons. The investigated iron-manganese oxide mineralization is found as secondary incrustate cement forming films and thin crusts on rounded quartz grains. Thickness of the oxide films and crusts varies from 10-20 mcm to 2-3 mm. Chemical composition of the mineralization (mass %, mean value in brackets) is: MnO2 0-12.45 (4.57); MnO 0-1.04 (0.47); Fe2O3 1.11-18.25 (5.28); FeO 0-0.31 (0.03). Analyses show that Mn content inversely correlates with Fe content (r=-0.47) in the ore sands. This fact conforms with signs of replacement of ferric hydroxide by manganese hydroxide. An outstanding feature is lower, like in river sand, contents of Co, Ni, Cu, Zn, Cr (0-100 ppm). Their concentrations are 3-5 times lower than in paleosol loams. The total Mn content in the productive horizons almost entirely comes from MnO2 (r=0.99) which accounts for the chemical composition approaching that of high-grade commercial ores (Mn/Fe=1.56; MnO2/Mn=1.20). In the investigated profile, iron and manganese must have been supplied by river water. Manganese seems to have accumulated in water-bearing horizons of ferruginate alluvial sands. The mechanism of manganese accretion from water included chemical sorbtion and oxidation of Mn2+ on the previously deposited iron hydroxides. We suggest that the mineralization under study should be referred to as a peculiar - aquagenic - type of ore formation.