Stable carbon isotope ratio, magnetic and chemical characteristics in Early Pleistocene hydromorphic soils of Lesser and North Caucasus as palaeoclimate indicators

EKATERINA STOLPNIKOVA[1], NATALIA KOVALEVA[2]

[1] A.N. Severtsov Institute of Ecology and Evolution, 119071, Russia, Moscow, Leninskiy prosp., 33, opallada@gmail.com

[2] Lomonosov Moscow State University, Faculty of Soil Science, 119991, Russia, Moscow, GSP-1, 1-12 Leninskie Gory, natalia_kovaleva@mail.ru

Early Pleistocene palaeosols and pedolithic sediments were discovered in the Paleolithic sites and quarries in tephro-soil and lagoon-marine series of plateau-like surfaces of the Lesser and Northern Caucasus. In the Lesser Caucasus, the objects of research were located in the Lori and Verkhneakhuryan depressions (north of Armenia). In the Early Paleolithic site Karakhach (1800 m above sea level), dated by the subchron Olduvai (Trifonov et. al., 2016), a tephro-soil sequence with two palaeosols is described. The cultural layers and buried soils are covered with powerful (4 m) ash-volcanic sediments with low acidic pH values (pH_{KCl} 4.9-5.1; pH_{H2O} 5.6-6.0). The upper palaeosol (layers 1-3), formed on the pebbled deposits, lies at a depth of 6.2-7.4 m and has a reddish brown color. Lower pebbly and sandy sediments (layers 4-10) have signs of hydromorphism (blue-gray shades of color, Fe-Mn plots, washed ash layer). The second buried soil (layer 11, at a depth of 10.8 m) has a brown color, relative increase in the content of organic carbon and nitrogen. The values of magnetic susceptibility (χ= up to 643,4*10^{-6} cm^3/g, CGS). and is the content of inorganic phosphorus are diagnose the presence of two stages of volcanic activity. Minimum values of magnetic susceptibility are fixed in paleosols and are an indicator of stable soil formation conditions when sedimentation is slowed down. $\delta^{13}C_{org}$ in palaeosols diagnoses a humid climate with a predominance of C3 type vegetation (-25.9-26.4 and -26.8 ‰). Similar hydromorphic soil on gravels was found in the Early Pleistocene deposits of the Upper Akhuryan basin.

Pedolitic sediments of low salinity hydromorphic soils were found in excavations in the territory of Dagestan (Russia) at altitude of 1629 m above sea level in Early Paleolithic site Muhkai IIa (Amirkhanov et.al., 2016). $\delta^{13}C_{org}$ is -25,1-26,4‰. Low values of magnetic susceptibility and abundance of Fe-Mn ortstein indicate the hydromorphic coastal landscape in the past.