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RADIOCARBON DATING FOR EXPOSURE THE CONNECTION BETWEEN HUMUS AND CARBONATES IN THE RUSSIAN STEPPE PALEOSOLS ON DIFFERENT PARENT ROCKS

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The radiocarbon (RC) dating of humus and carbonate accumulations (CAs) from two Holocene chronosequences of paleosols buried under the archaeological monuments (kurgans) and developed on sandy and loamy parent rocks has been carried out in the steppe Pre-Ural region of Russia (Orenburgskaya oblast). Two chronosequences studied were located in the vicinity to each other at the same geomorphological, hydrological and climatic conditions. The background modern soils formed on the studied area are the Southern Chernozems. The paleosols were buried under kurgans of the Pit-grave culture (the end of the third millennium BC) and the Golden Horde period (XIII-XIV centuries AD). In two chronosequences the modern soils and paleosols buried under the same archaeological culture kurgans have been compared in pairs. The aim of the work was to detect connection between humus and carbonate profiles and its changes with time on the basis of RC dating of humus and CAs in the chronosequences of soils derived from different parent rocks.

The RC age of humus and CAs collected from the same depths in the even-aged soils on the loamy rocks is older than in the soils on sandy rocks in all cases, at that for the

RC age of CAs from the paleosols buried at the middle Holocene to nowadays this difference increases. It means that for the time-span studied the carbon rejuvenation in humus and CAs of the soils derived from the loamy rocks was slower than in the sandy soils. The difference between RC dates of CAs and humus in the loamy soils is higher than in the sandy soils in all cases and it increases from the middle Holocene to nowadays in both chronosequences. This is seeming evidence of slower rejuvenation of carbon in CAs in comparison with humus, as if it is some part of carbon in CAs does not rejuvenate with time. However, if we compare RC age of CAs step by step in neighboring soils in the chronosequence with time-span between the dates of their burials, there were periods both of considerable rejuvenation and disproportionate ancient ion of carbon in CAs. This regularity is especially clear evident in the paleosols with distinctly expressed arid properties regardless of the date of their burial. The difference between RC dates of CAs and humus increases every time in arid epochs because the processes of humus accumulation reduce and ones of carbonate accumulation accelerate at that the CAs are enriched by "old" carbon due to accelerated mineralization of humus in such epochs. The RC age of humus and CAs in arid epochs increase in the chronosequences studied. However, we observed a disproportion between the rate of increasing of humus and CAs RC age: the RC age of carbonates increases quicker than that of humus. It means that the carbonates have another source of "old" carbon in addition of that from the humus mineralization. Micromorphological and submicromorphological observations suggest that it might be a movement of carbonates in soil profile as a colloidal suspension without carbon exchange with soil air and solution.

In the modern background soils which were arable on the sandy parent rocks and virgin on the loamy ones, the difference between RC ages of humus and CAs are sharply differ in comparison with such data for "neighboring" paleosols of the Golden Horde period due to the difference of economic using of modern soils.

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