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AGE OF THE PALEOLITHIC SITE SUKHAYA MECHETKA (LOWER VOLGA REGION)

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Introduction

Mousterian archaeological sites are widespread in Europe, North Africa, Central Asia, the Middle East, and south of Siberia. In addition to the many problems of correlation of *Homo* species and Paleolithic cultures, there is the problem of the lack of absolute dates for the Mousterian. According to most researchers, this culture developed during the epochs of the Moscovian (Riss, MIS-6) glaciation, the Mikulinian (Eemian, MIS-5e) interglacial up to the Bryansk (Middle Würm, MIS-3) interstadial. Until the development of radiometric methods (particularly optically stimulated luminescence) in the late 1990s, it was almost impossible to obtain absolute dates (because of the limits of the radiocarbon method). In many European (in contrast to Russian) archaeological sites, the problem of absolute age was already solved because of many dating laboratories.

The Sukhaya Mechetka Mousterian site (Volgograd, Russia) is in a unique geographical position. It was discovered in 1951 by M.N. Grischenko (Grishchenko, 1953; Moskvitin, 1962). It is located within the Caspian depression, which was repeatedly flooded by the Caspian Sea during the transgression epochs in Pleistocene history and buried under marine sediments of the Early Khvalynian transgression of the Caspian Sea. The aims of this research are (1) ascertaining the absolute age of the Sukhaya Mechetka site by correlating its stratigraphic position with the Srednaya Akhtuba section on the opposite side of the Volga-Akhtuba valley because of the presence there of reliable OSL dates, and (2) comparison with other Mousterian sites of the southern Russian plain.

Sukhaya Mechetka site

Since the discovery of the Sukhaya Mechetka site, notions of its age have varied. M.N. Grishchenko (1953) dates it within the Odintsovian (MIS-7) interstadial. N.K. Vereshchagin and A.D. Kolbutov (1957) classify the cultural layer as the end of the Khazarian cycle of sedimentation in the Caspian Sea (MIS-6 to MIS-5e). V.I. Gromov and E.V. Shanzer (1958) consider that the site is not younger than the Moscovian (Riss, MIS-6) glaciation. A.A. Chiguryayeva and N.Y. Khvalina (1961) relate the time of human habitation to one of the treeless phases of the Khazarian period (MIS-6). Yu.M. Vasil'ev (1961) relates the site to the paleosol in the upper part of the Lower Khazarian horizon (MIS-6). G.I. Goretsky (1966) considers that the deposits of the periglacial formation and the buried soil within the site formed at the end of the Dnieperian glaciation (Sozhian, Odintsovian, and Moscovian time, MIS-7 to MIS-6). A.I. Moskvitin (1962) believes that the site is located on the Mikulinian (Eemian, MIS-5e) soil and is covered by Akhtubian periglacial sands (MIS 4-3). Dolukhanov et al. (2009) consider that the age of the site is much younger, and they relate it to the Atelian (MIS-3 to MIS-2) regressive epoch of the Caspian Sea, which was in the LGM in their opinion. The bones of large mammals *Canis lupus* L., *Elephas* sp., *Cervus elaphus* L., *Saiga tatarica* L., *Bison priscus* Bif., and other species were found in the cultural layer (Vereshchagin and Kolbutov, 1957).

The upper part of the section is composed of Khvalynian "chocolate" clays with thin sandy interlayers filled with the shells of *Didacna ebersini*, *Hypanis plicatus*, *Monodacna caspia*, and *Dreissena polymorpha*. They are underlain by sandy-loam Atelian strata (5 m) with poorly expressed traces of soil formation in the middle part. Further, there is a dark brown-gray, poorly developed soil-horizon (S1) (which lies upon the cultural layer) with wedges penetrating into the underlying sediments. In the gullies near the site, there is a well-humified soil (S2) (15 cm) developed on the loam under S1. Under the soil, there are light-gray sands with horizontal interlayers of loam and sandy clay (total thickness of 2.2 m), containing numerous shells of trigonoid *Didacna* and slightly saline index-species of the freshened Khazarian basin. They are underlain by ferruginous sandy clays, including shells of similar species (3 m). A.I. Moskvitin (1962) defines the two developed soil-horizons as Mikulinian and Odintsovian, respectively, in his interpretation of the section. Thus, the time of site-formation he defines as a transition from the Mikulinian interglacial to the Early Valdayian (MIS-5e to MIS-4) cooling.

Srednaya Akhtuba section

The Srednaya Akhtuba site contains Early Khvalynian "chocolate" clays in the upper part. Underneath them there are Atelian strata represented by alluvial sands and loess. Below in the section, there are loess-like deposits with three soil horizons (S1: bluish-gray, broken by thick ice-wedges; S2: dark gray, broken by small ice-wedges; and S3: brownish, with carbonate nodules), developed over loess-like loams. A.I. Moskvitin (1962) defines the S1and S2 soil horizons as Mikulinian and Odintsovian, respectively, and apparently they correlate with the S1 and S2 soils in the Sukhaya Mechetka site.

In 2017, OSL dates were obtained for the first time for the Lower Volga sediments (Srednaya Akhtuba section) (Yanina et al., 2017). Sediment for dating was sampled at night in opaque plastic bags. Dating was conducted by the author in the Nordic Laboratory for Luminescence Dating, Aarhus University, under the guidance of professor A.S. Murray. Dates for the Khvalynian and Atelian strata were obtained by quartz and for loess-like loams and soil horizons by feldspar. As a result, the soil horizons are related to the warmings of the 5th isotopic stage (MIS-5e, -5c, -5a). The soil correlates with the soil of the cultural layer, and a date of 68,280±4170 was obtained (Yanina et al., 2017).

Comparsion with other sites

In the southern part of the Russian plain, there is only one more well-known Mousterian site—Rozhok (Veselo-Voznesenka, Rostov region). It is located on the left side of the large Bulnaya gully flowing into Taganrog Bay (Sea of Azov), 0.5 km east of the village Rozhok and 45 km west of Taganrog city. This site was opened by N.D. Praslov (1969). This site contains 6 cultural layers. It is located on the Beglitskaya marine terrace (MIS-7, unpublished data). The general geological structure is: loess strata lie on subaquatic limanic deposits, which lie on the indigenous limestones of Sarmatian time. The loess strata are cut by a series of paleogullies and filled with deluvial deposits. In the lower part of these strata, cultural layers are located (usually not more than 10–20 cm in thickness). There are different opinions about the absolute age of these deposits. M.D. Grishchenko (1965) believes that these sediments relate to the time of the retreat of the Dnieper glacier (MIS-7). N.D. Praslov (1969), and also A.A. Velichko (1968) believe that the sediments have a younger age—Mikulinian (MIS-5e) or Early Valdayian glaciation (MIS-5a-d to MIS-4). This can be judged on the basis that the cultural layers lie below the horizon of ephemeral soil formation, which most likely is the Bryansk soil (MIS-3) (S1). In the lower part, there is a strongly humified soil, which is most likely Mezin (MIS-5) (S2). This is indicated by the palynological data of V.P. Gritschuk, who revised the analysis data obtained by V.A. Vronsky, and came to the conclusion that the

Mikulinian (MIS-5e) age of sediments contained the cultural findings (Praslov, 1969). Also evidence of the age of this site is in the cultural layer found in the area of the famous, well-studied section—Beglitsa. In this context, I.K. Ivanova and Yu.M. Vasilyev found a Mousterian nucleus in sediments above the Mezin pedocomplex (MIS-5e) and under the Bryansk (MIS-3) interstadial soil.

Conclusions

It can be concluded that, apparently, there is a correlation between the S1 (Srednaya Akhtuba), S1 (Sukhaya Mechetka), and S2 (Rozhok) soils. Cultural layers in the Sukhaya Mechetka and Rozhok sites have the same stratigraphic position (exactly on strata that correspond to MIS-5e). Thus, the absolute age of the Sukhaya Mechetka cultural layers can be determined as 65–71 ka (based on OSL-dates from the Srednaya Akhtuba site) and related to the end of the warm stage of MIS-5a, which confirms the assumptions about its Early Valdayian age.

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