Short communication

ISSN 2658-3518
LIMNOLOGY FRESHWATER BIOLOGY
www.limnolfwbiol.com

Paleohydrological events and ancient man in the valley of the Western Manych River (the Ponto-Caspian region, Russia)

Lavrentyev N.V.*

Moscow State University, Faculty of Geography, Laboratory of Recent Deposits and Pleistocene Palaeogeography, GSP-1 Leninskie gory, Moscow, 119991, Russia

ABSTRACT. This article discusses the interaction of ancient man and the aquatic environment in the Western Manych River Valley.

Keywords: Late Pleistocene, Late Paleolithic, Manych River Valley, Khvalyn transgression

1. Introduction

The valley of the Western Manych River, due to its low position, served as a water exchange route between the Black and the Caspian Seas (Danilevskiy, 1869).Many researchers have been studied the structure of the Manych Valley, however, hypotheses about an origin of the Manych Valley for the Pleistocene were primarily based on assumptions of Popov (1983).

The Manych depression was filled with sea water from the end of Pleistocene (the Early Khvalynskaya transgression, + 50 m abs.) At the same time, there was a flow of Caspian waters through the Manych depression into the Azov Sea and the Black Sea (Novoevksinsky basin, -50, -100 m abs.) (Yanina, 2006; Chepalyga et al., 2007).

The Manych Valley is located on the border between Europe and Asia and it is likely a migration route for the ancient population. Many researchers have been searching Paleolithic monuments in the Manych Valley, however, until the end of the twentieth century, only few Mesolithic sites were known here. Thus the site Yulovskaya of Late Paleolithic was discovered in 1994 in clear stratigraphic conditions on the left bank of the Zapadny Manych River (Simonenko, 1998). The site was investigated by a team of the Don Archaeological Society lead by of Tsybriy in 1997 (Tsybriy, 2000). Later the site was studied by the Paleohydrological group of the Institute of Geography of the Russian Academy of Sciences (A. L. Chepalyga, N. V. Lavrentyev et al.) and the Biodiversity Laboratory of the Research Institute of Biology of the Southern Federal University (O. N. Demina et al.), with the support of the Don Archaeological Expedition of Moscow State University during 2006-2008.

Currently, the main research materials on the Late Paleolithic site of Yulovskaya have been published (Lavrentiev et al., 2012). However, the malacofauna of the Khvalyn transgression was not found in the sediments of the Late Paleolithic site of the Yulovskaya. Therefore, it was not possible to link the cultural layers of the Late Paleolithic site of Yulovskaya to the Khvalyn deposits.

Recently, new absolute dating of the deposits of the Khvalyn transgression has appeared (Arslanov et al., 2016; Semikolennykh et al., 2022). These datings make it possible to clarify the correlation of the cultural layers of the Yulovskaya site with the deposits of the Khvalyn transgression of the Caspian Sea.

2. Materials and methods

The Late Paleolithic site - Yurovskaya is located in the Salsky district of the Rostov region, 5 km south-east from Yulovsky, on the steep left bank of the Zapadny Manych River (GPS 46.75008915˚ N, 41.52271280˚E).

The 7 m thick section studied is represented by lacustrine, subaquatic, and subaerial sediments (Lavrentyev et al., 2012). In the bottom-to-top section, three main lithological facies are distinguished:

1. the lower lithological facies are represented by coarse-layered lake loams with freshwater fauna of stagnant reservoirs, the apparent thickness is 3 m;
2. the middle lithological facies are represented by an alternation of thin-layered loams with a stagnophilic fauna, 1.5 m thick, and cultural layers 2 and 3 are confined to this lithological facies (Tsybriy, 2000);
3. the upper lithological facies are represented by subaerial loams with a total thickness of 2.5 m, in the middle part of the layer there is cultural layer 1 (Tsybriy, 2000).

In addition, individual coals were found in the excavation. Coal samples were taken for radiocarbon analysis (Amirkhanov and Praslov, 2001) from cultural

*Corresponding author.
E-mail address: lvnikita@gmail.com (N.V. Lavrentyev)

Received: May 30, 2022; ***Accepted:*** July 26, 2022;
Available online: September 02, 2022

layers 2 and 3:

Sample 1 is represented by individual coals, at a depth of 2.88-2.89 m, lithological facies 2. Radiocarbon age - 16650 ± 220 years ago (OxA - 9510). The calibrated date is 18674 years ago.

Sample 2-is represented by coals from the focal spot of the cultural layer 3, at a depth of 3.92 m – 3.96 m, lithological facies 2. Radiocarbon age-17450 ± 400 years ago (OxA - 9511). The calibrated date is 20280 years ago.

Sample 3-is represented by coals from the focal spot 3 of the cultural layer 3, at a depth of 3.94-3.98 m, lithological facies 2. Radiocarbon age-15290 ± 260 years ago (OxA - 9555). The calibrated date is 17205 years ago.

During the field work of the Paleohydrological Group, a horse bone was discovered at a depth of 4.9 meters in lithological facies 1. This bone was dated (Chepalyga et al., 2008). The radiocarbon age is 19540 ± 1470 years ago (LU-5852). The calibrated date is 25546 years ago.

The OxCal 4.4 program was used to calibrate the dates.

Palynology analysis was carried out for the upper 5 meters of the section of Shilova. Samples were taken after 5 cm in the middle part of the section, including the main horizons of the finds, and after 10 cm in the rest of the section; a total of 75 samples were studied (Lavrentyev et al., 2012).

According to Shilova, the samples at a depth of 4.9 m in the lake lithological facies 1. Belong to the Bryansk interstadial. Cultural layers 2 and 3, which are located in the subaqual lithological layer 2, belong to the LGM according to the polynological data. The cultural layer 1 is located in the lower part of the lithological layer 3 belongs to Dryas-1.

At the boundary between the lithological layer 2 and the lithological layer 3, the highest rate of re-deposited spores and pollen is recorded. There is also a lot of redeposited pollen in the lake sediments of the lithological layer 1.

According to V. V. Tsybriy (2000), the flint tools of the Yulovskaya site have an Upper Paleolithic appearance.

As for the absolute dating of the sea terraces of the Early Khvalyn transgression of the Caspian Sea. According to the authors of the study (Arslanov et al., 2016), the maximum stage (from 48 to 50 m) of the early Khvalyn transgression has not been dated. The transgressive stages of the early Khvalyn basin with sea levels 35-22 meters above sea level occurred approximately 16-14 thousand years ago.

As for the Khvalyn deposits in Manuch Depression, the nearest section is located 60 km upstream from the Late Paleolithic site of Yulovskaya, near the village of Manych-Balabinka. There is a dating of the early Khvalyn fauna 14300 + -680 thousand years ago. MSU - 1491 (Svitoch and Yanina, 2001). The calibrated date is 17138 years ago.

164 kilometers downstream from the Late Paleolithic site of Yulovskaya, on the western tip of the island Left, OSL-datings were selected from the Khvalyn deposits. According to the authors of the study (Semikolennykh et al., 2022), based on the results of OSL-dating, the time of functioning The early Khvalyn Strait in the Manych depression was determined in the range of 17.7–14.9 thousand years ago.

3. Results and discussion

The upper part of the lake sediments of the lithological layer 1 belongs to the Bryansk interstadial. As evidenced by the data of palynological analysis (Lavrentyev et al., 2012), as well as the dating of the horse bone 25546 years ago LU-5852 (Chepalyga et al., 2008). These are the deposits of the Gudilovsky Lake in its regressive stage.

Cultural layers 2 and 3 were formed in subaqual deposits of lithological layer 2, during LGM. This is confirmed by radiocarbon dating in the range of 17-20 thousand years ago (Amirkhanov and Praslov, 2001), and data from the polynological analysis (Lavrentyev et al., 2012). The territory of the Late Paleolithic site Yulovskaya was repeatedly flooded. Most likely, the Late Paleolithic site of Yulovskaya had a seasonal fishing and hunting character. The duration of habitation at the Late Paleolithic site of Yulovskaya is probably up to several months in the warm seasons of the year.

The Late Paleolithic site of Yulovskaya is located at the bottom of the Manych Valley. Consequently, it could have been flooded by the Manych Strait of the Early Khvalyn Sea. However, in the stratigraphic section of the Yulovskaya site there are no deposits of the Manych Strait of the Early Khvalyn Sea. Basically, the coastal cliffs of the Veselovsky reservoir, where the Late Paleolithic site of Yulovskaya was discovered, are represented by Gudilov deposits with freshwater malacofauna of standing reservoirs (the second above-floodplain terrace), and the first above-floodplain (Khvalynskaya) terrace is flooded by the reservoir (Lavrentyev and Chepalyga, 2011). Therefore, the flooding of the Late Paleolithic site of Yulovskaya by the Manych Strait of the Early Khvalyn Sea can be proved by indirect signs. Above the cultural layers 2 and 3, at the boundary between the lithological layer 2 and the lithological layer 3, the maximum peak of re-deposited spores and pollen is recorded. The pollen was probably transferred by the Manych Strait of the Early Khvan Sea. This hypothesis is confirmed by the dating of the Early Khvalyn fauna of the Manych Strait, which are in the range of 17.7–14.9 thousand years ago (Svitoch and Yanina, 2001; Semikolennykh et al., 2022).

Probably, the flooding of the territory of the Late Paleolithic site Yulovskaya by the Manych Strait of the Early Khvalyn Sea forced the ancient people to leave the Manych Valley. However, after that the Manych Strait ceased to exist. The ancient people returned to the territory of the Late Paleolithic site Yulovskaya (cultural layer 1). According to the data of the polynological analysis (Lavrentyev et al., 2012), the cultural layer 1 belongs to Dryas-1. This refers to the era of deglaciation of the Late Valdai glaciation

However, an additional research is required to confirm this hypothesis.

4. Conclusions

The published new datings of the Early Khvalyn deposits of the Manych Valley allowed us to clarify the stratigraphic position of the cultural layers of the Late Paleolithic site of Yulovskaya. And we also managed to confirm the previously published conclusions.

So, the formation of cultural layers 2 and 3 occurred in the LGM era, 17-20 thousand years ago. Then the Manych Strait of the Early Khvalyn Sea flooded the territory of the Late Paleolithic site Yulovskaya during the beginning of the deglaciation of the Late Valdai glaciation, 17-15 thousand years ago.

After the drainage of the Manych Valley, the ancient people returned to their former habitats (cultural layer 1).

Conflict of interest

The author declares no conflict of interest.

References

Amirkhanov H.A., Praslov N.D. 2001. Travaux sur le paléolithique de la Russie Européenne. In: Commission VIII – XIVe Congrès UISPP, pp. 15-25. (in French)

Arslanov K.A., Yanina T.A., Chepalyga A.L. et al. 2016. On the age of the Khvalynian deposits of the Caspian sea coasts according to 14c and 230th/234u methods. *Quaternary International* 409: 81-87. DOI: 10.1016/j.quaint.2015.05.067

Danilevskiy N.YA. 1869. Extract from a letter of N.Ya. Danilevskiy about the results of his trip to Manych. Zapiski Imperatorskogo Russkogo Geograficheskogo Obshchestva po Obshchey Geografii [Notes of the Imperial Russian Geographical Society on General Geography] 2: 139-180. (in Russian)

Chepalyga A.L., Lavrentiev N.V., Pirogov A.N. 2007. Extreme sedimentation in the Manych valley during Khvalynean transgression. In: Proceedings of the 10th International Symposium on River Sedimentation, pp. 37-47.

Chepalyga A.L., Arslanov Kh., Svetlitskaya T. 2008. Chronolgy of the Khvalynian sea-level oscillations: new data and approach. In: IGCP 521: "Black Sea–Mediterranean Corridor during the last 30 ka: Sea level change and human adaptation", pp. 32-34.

Lavrentyev N.V., Chepalyga A.L.2011. Sal'skiy porog stoka khvalynskogo basseyna Kaspiya. In: Bolikhovskaya N.S., Faustov S.S. (Eds.), Problemy paleogeografii i stratigrafii pleystotsena. Sbornik nauchnykh statey. T. 3 [Problems of paleogeography and stratigraphy of the Pleistocene. Collection of scientific articles. Vol. 3]. Moscow: Geograficheskiy fakul'tet MGU, pp. 191-198. (in Russian)

Lavrentyev N.V., Chepalyga A.L., Tsybriy V.V. et al. 2012. *Paleoecologic situation of Late Paleolithic in Zapadny Manych River valley. European Researcher. Series A 28*(9-1): 1385-1398. (in Russian)

Popov G.I. 1983. Pleystotsen Chernomorsko-Kaspiyskikh prolivov: stratigrafiya, korrelyatsiya, paleofaunistika, geologicheskaya istoriya. Moscow: Nauka. (in Russian)

Semikolennykh D.V., Yanina T.A., Kurbanov R.N. 2022. Opornyy razrez khvalynskikh otlozheniy Manycha Ostrov Levyy. In: Scientific readings Exolit-2022 "Litologiya osadochnykh kompleksov fanerozoya i dokembriya [Lithology of Phanerozoic and Precambrian sedimentary complexes]", pp. 124-127. (in Russian)

Simonenko V.A. 1998. Arkheologicheskaya razvedka na r. Manych. Istoriko-Arkheologicheskiye Issledovaniya v g. Azove i na Nizhnem Donu v 1995 -1997 gg. [Historical and Archaeological Research in the City of Azov and on the Lower Don in 1995 -1997] 15: 157-159. (in Russian)

Svitoch A.A., Yanina T.A. 2001. New data on the mollusk fauna from the marine Pleistocene of Manych. *Doklady Biological Sciences* 380(1-6): 478-481. DOI: 10.1023/A:1012335724359

Tsybriy V.V. 2000. Verkhnepaleoliticheskaya stoyanka Yulovskaya. Arkheologicheskiye Zapiski [Archaeological Notes] 1: 15-30. (in Russian)

Yanina T.A. 2006. Depressiya Manycha kak oblast' migratsiy faun Ponto-Kaspiya v pleystotsene. Geomorfologiya [Geomorphology] 4: 97-106. (in Russian)