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## **Nikolaevo-Otradnoye II— A New Early and Middle Paleolithic Site in the Northeastern Azov Region**

*We describe materials from a new Paleolithic site, discovered in 2020 on the right bank of Mius estuary, near its confluence with the Taganrog Bay of the Sea of Azov, in the southern outskirts of the village of Nikolaevo-Otradnoye, which is in the Neklinovskiy District of the Rostov Region. The clearing of a 10-meter-high river-bluff revealed a complex stratigraphy of subaqueous and subaerial Late and Middle Pleistocene rocks. Horizons with lithics and faunal remains were identified. Cultural remains found in the coastal exposure and in the stratigraphic section belong to the Early and Middle Paleolithic. The early stage in the peopling of the Northeastern Azov and the Lower Don regions is documented by Early Paleolithic artifacts found in the subaqueous deposits of layers 5 and 6 (MIS 9–11, ~420–270 ka BP). Heavily waterworn patinated lithics include a core-shaped artifact, various types of side-scrapers, a scaled piece, flakes, and chips. This complex is an informative addition to known complexes from the region, including contemporaneous ones. The most interesting is the Middle Paleolithic industry of layer 4 under the Kamenka (?) soil—layer 3, MIS 7. The toolkit consists of a diagonal side-scraper and a chip found in the section, as well as radial and Levallois cores, various side-scrapers, a partly bifacial tool, spalls, and chips found in the denudation. Technological and typological criteria (primarily the Levallois technology) and the tentative date of non-waterworn patinated lithics*

*make it possible to attribute them to the Early Middle Paleolithic of the southern Russian Plain. It is concluded that cultural remains of the Early Middle Paleolithic, dating to ~243–191 ka BP, have been found in the region for the first time, filling the gap in the local Early Middle Paleolithic sequence. In adjacent regions, similar industries have been known since the late 1900s.*

**Keywords:** *Northeastern Azov region, Early and Middle Paleolithic, Mius estuary, early peopling of Eastern Europe, Middle Paleolithic humans, stone tools.*

## Introduction

In the Middle and Late Pleistocene, climate and environmental settings in the Northeastern Azov region provided favorable conditions for the accumulation of sedimentary loess-soil deposits, which contain numerous paleontological and archaeological items. The loess-soil series of the Northeastern Azov region occurs on lagoon deposits of various ages, constituting a complex of terraces (Lebedeva, 1972; Konstantinov et al., 2018) up to 30 m thick, with six well-distinguished buried pedocomplexes (Velichko et al., 2012). Paleolithic sites in the region have provoked the longstanding interest of specialists (Danilchenko, 2022); their systematic research began in the late 1920s. An important stage in studying the “Mousterian and pre-Mousterian” sites on the coast of the Taganrog Bay was the research carried out by N.D. Praslov in the first half of the 1960s (1968). Since 2016, the Azov Expedition from the Institute for the History of Material Culture of the Russian Academy of Sciences has been working in the Northeastern Azov region (Otcherednoy et al., 2018). During the survey of archaeological heritage sites in 2020, Y.N. Zorov

discovered two new sites with cultural remains of various periods, from the Paleolithic to the Middle Ages, on the southern outskirts of the village of Nikolaevo-Otradnoye in the Neklinovsky District of the Rostov Region, on the right bank of the Mius estuary (Fig. 1). This article presents the evidence of the Early and Middle Paleolithic materials discovered at the site of Nikolaevo-Otradnoye II.

## Materials

The coastal cliff was unearthed in the area where it had the most complete profile of subaqueous deposits underlying loess-soil series (Fig. 2). The works revealed the presence of the following lithological and stratigraphic units at the Nikolaevo-Otradnoye II site (as documented by the 2021 section).

*Layer 1* (0.0–0.8 m). Modern chernozem-like soil of a dark gray color and granular-lumpy texture, partially washed away by surface erosion. The mechanical composition is light loam.

*Layer 2* (0.8–2.6 m). Light, pulverous brown-straw-colored loess-like loam, with scattered loose pulverous carbonates.

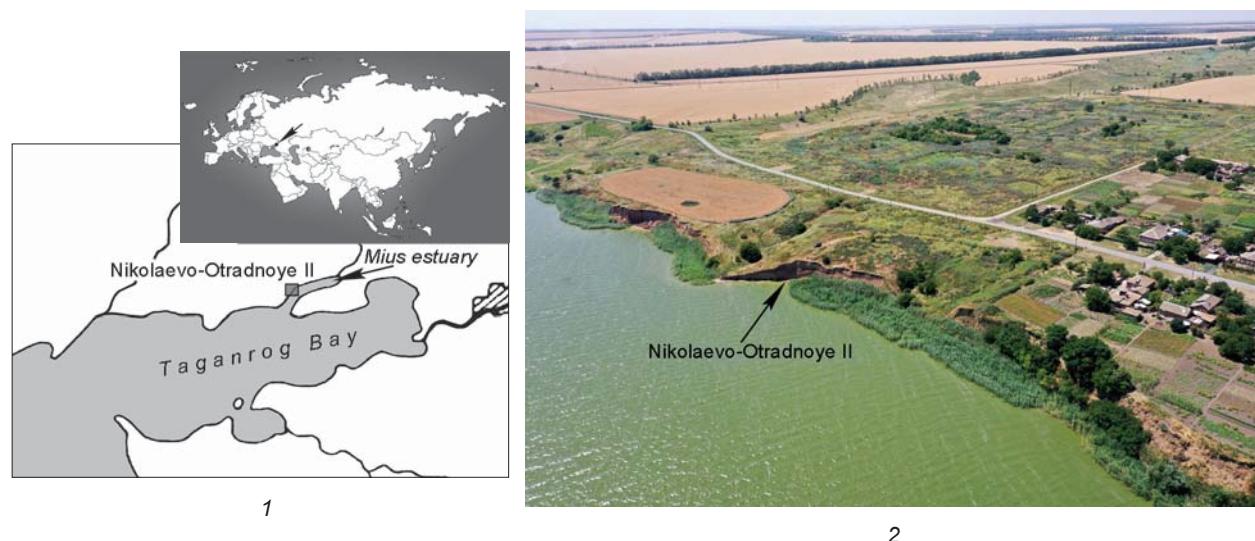


Fig. 1. Location of the Nikolaevo-Otradnoye II site (1), general view of coastal section of the Mius estuary (2).

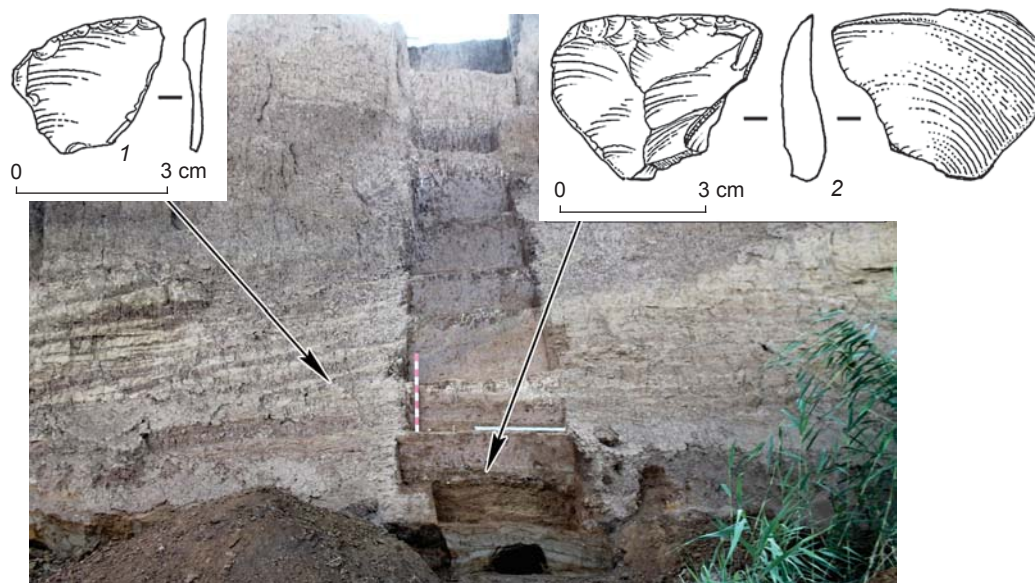


Fig. 2. Clearing of the outcrop of the coast.

1 – scraper-like item *in situ* from layer 4; 2 – scraper-like like *in situ* from layer 5 at Nikolaevo-Otradnoye II.

**Layer 3** (2.6–4.4 m). Distinctive pedocomplex (Kamenka?). Loam ranging from gray-brown (in the upper part) to dark brown (in the bottom part), with humic spots and streaks, inclusions of loose carbonate nodules and small gypsum crystals. The buried soil increases in thickness as it extends towards the north-northeast, displaying a richer, saturated dark brown coloration, and cracks filled with soil from the layer above. Along the strike to the south-southwest (in the direction of the ravine), buried soil is facially replaced by dark gray-brown pedosediment, filling an erosional hollow.

**Layer 4** (4.4–6.0 (6.5) m). Oblique interlayering of yellow-gray light loam and medium brown humic loam. The slope of the layers is directed towards the ravine to the south-southwest, with an angle of gradient reaching 15–20°. The filling material consists of products of deluvial-slope demolition of ancient dark brown buried soil. Interlayers are discontinuous, with many small lenses. Individual flints with white patina were found in the lower part of the paleoincision in the unearthed area.

**Layer 5** (6.0 (6.5)–8.1 m). Subhorizontal wavy interlayering of yellow-brown unevenly grained gravelly sand, with medium light brown loam and straw-colored sandy loam. The thickness of interlayers ranges from 1 to 10 cm. The interlayers are not clearly distinct along the strike; they frequently intersect and contain numerous lenses. In the upper part of the layer (0.5 m), there are noticeable inclusions of different

shell debris, with individual intact shells measuring around 5–7 mm. Towards the base of the layer, where rounded objects resembling Early Paleolithic artifacts can be found, there is a 10 cm interlayer rich in crushed flint fragments and grus.

**Layer 6** (8.1–8.5 (8.6) m). Unevenly grained sand with gravel and pebbles, grus, and rubble (up to 30 %). Clasts are predominantly of flint. The layer contains sandy lenses with thin oblique bedding. In some places, the pattern of the interlayers is cross-bedded. The lower contact zone is abrupt and wavy.

**Layer 7** (8.5 (8.6)–9.1 m). Layered light gray loam with red interlayers. The interlayers are uneven, with upward bends and folds. Mushroom-shaped deformations, which are probably collapsed structures, are observed 5 m southwest of the main stratigraphic section.

**Layer 8** (9.1–9.9 m). Gray-yellow layered unevenly grained sand with gravel (up to 5 %).

The structure and composition of the deposits allow for a preliminary genetic and stratigraphic interpretation to be made. According to its lithological features and stratigraphic position, the light loess-like loam (layer 2), underlying the modern soil, can be correlated with late Valdai loess (MIS 2). It was weakly subjected to pedogenesis, and overlays layer 3 with erosion. The color and textural features of the pedocomplex from layer 3 unambiguously indicate the pre-Mikulín (Middle Pleistocene) age (Velichko et al., 2012; Panin et al.,



2018). The Kamenka pedocomplex (MIS 7) has a very similar morphological appearance; it has a gray-brown color. Cracks filled with light loess have been observed in some stratigraphic sections (Chumbur-Kosa, Vorontsovka). The underlying obliquely layered deposits of layer 4 are a filling of a paleoincision—a small ravine or hollow. The filling material partly constitutes erosion products of dark brown buried soil. The sand and gravel band at the base of the section (layers 5–8) consist of interlayered ravine alluvium and lagoon deposits. Such a complex of sediments could have resulted from sea ingression, which spread up a ravine or small valley.

The average content of sand is 4.2 % in the upper part of the loess-soil series (layers 1 and 2), and 2.2 % in layer 3. A sharp change in the distribution of particle sizes indicates a probable break in sedimentation and disruption of regular loess-soil structure. Layer 3 in the section of Nikolaev-Otradnoye II consists of very thick buried soil with high values of magnetic susceptibility, loose carbonate concretions, gypsum crystals, and deep vertical cracks. In terms of particle-size distribution, this layer almost does not differ from layer 4. Taking into consideration the textural characteristics, layer 4 can be classified as pedosediment, which is a result of erosion and redeposition of more ancient soil on slopes. The observed interlayering, particle-size distribution, and the presence of aquatic fauna suggest that layers 5–8 can be confidently identified as a sedimentary unit originating from the coastal zone of a shallow bay or lagoon.

Faunal remains have been found both on the beach directly under the outcrop and in the layer (small fragments of tubular bones, fragment of a mammoth's enamel plate). Small bone fragments from ungulates and plates of elephant teeth, as well as hardly identifiable remains of rodents and freshwater fish, were found in layer 5 during surface examination and washing of the soil. The enamel thickness of three different fragments of elephant enamel plates ranges from 1.75 to 2.44 mm, with an average thickness of 2.1 mm, and corresponds to the boundaries of enamel variability in *Mammuthus trogontherii* (Pohlig, 1885), typical of the first half of the Middle Pleistocene, and *M. intermedius* (Jourdan, 1861). Individual waterworn and highly fragmented mammoth remains from *Mammuthus trogontherii* aut *intermedius*, deer Cervidae gen., and other large ungulates were found in alluvial layers. Lithological layer 5 contains numerous shells of fossil mollusks at a depth of 6.0 (6.5)–8.1 m:

Genus, species	Number, spec.
<i>Viviparus</i> sp.	4
<i>Microcolpia daudebartii acicularis</i> (Férussac, 1823)	20
Hydrobiidae gen.	2
<i>Lithoglyphus pyramidatus</i> (Möllendorf, 1873)	16
<i>Borysthenia intermedia</i> (Kondrashov, 2007)	5
<i>Valvata (Cincinna) piscinalis</i> (Müller, 1774)	1
<i>Unio</i> ex gr. <i>tumidus</i> (Philipsson, 1788)	3
<i>Unio</i> sp.	1
<i>Sphaerium (Rivicoliana) rivicola</i> (Leach in Lamarck, 1818)	7
<i>Pisidium amnicum</i> (Müller, 1774)	1
<i>Pisidium clessini</i> (Neumayr, 1875)	2
<i>Pisidium</i> sp.	1
<i>Dreissena polymorpha</i> (Pallas, 1771)	4
<i>Didacna</i> cf. <i>baericrassa</i> (Pavlov, 1925)	1
Cardiidae gen.	1
<i>In total</i>	69

The malacofauna mainly included freshwater river varieties and one brackish-water species of *Didacna* cf. *baericrassa*, indicating the proximity of the sea. It was common among the Early-Middle Pleistocene Chaudian fauna, but was also quite numerous among the Late-Middle Pleistocene Euxino-Uzunlarian fauna (MIS 9–11). Similar association of mollusks occurred in this region in the Lower-Middle Pleistocene (with remains of the Tiraspol faunal complex) deposits (Platovo, Semibalki-2, etc.) (Frolov, Kurshakov, 2015).

Paleolithic artifacts were discovered in both a coastal outcrop and in the area of the beach near the estuary, directly beneath the outcrop. These artifacts were categorized into two conventional complexes: Early Paleolithic and Middle Paleolithic. The so-called boulder flints of alluvial origin had been used as raw material. The flints derived from Upper Cretaceous sources appear as clasts with smooth, rounded dark gray crusts. These flints were likely transported by the paleo-Mius water flows from the southern spurs of the Donets Ridge, composed of Cretaceous rock formations.

The Early Paleolithic assemblage includes 31 flint items. The flints of this complex were waterworn and covered with reddish-brown and spotted yellow-brown patina. Some of the tools were made on natural fragments with traces of honeycomb weathering, or on flakes from cores. Directly in layer 5, the following tools were found: a small transverse side-scraper on a flake (Fig. 2, 2), a chisel-like tool (Fig. 3, 1), two flint chips, and six small spalls. Surface finds on the beach included 3 chips, 15 flakes of various sizes (Fig. 3, 4), a longitudinal convex side-scraper

on spall with surviving chalk crust (Fig. 3, 5), a longitudinal convex side-scraper with notched edge on natural fragment of pebble flint (Fig. 3, 2), and a robust core-shaped item with a distinct spike-like area on the retouched edge (Fig. 3, 3).

The Middle Paleolithic assemblage comprises slightly rounded flint artifacts with well-preserved edges, most often covered with a milky white or porcelain-like patina. There are 35 such items in the collection. Artifacts of that kind were found in the coastal outcrop layer and on the beach. A chip and a diagonal side-scraper on a small thin flake (see Fig. 2, 1), discovered in the lower part of layer 4, are considered a stratigraphic marker. The assemblage of finds collected on the beach includes 1 chip, 21 flakes of various sizes (Fig. 4, 4), 1 laminar spall (Fig. 4, 1), 6 cores with semi-volumetric and slightly convex working surfaces, and tools with traces of secondary processing. The cores with slightly convex working surfaces include some specimens with signs of radial reduction (Fig. 4, 2), as well as a Levallois core (Fig. 4, 3). Tools include

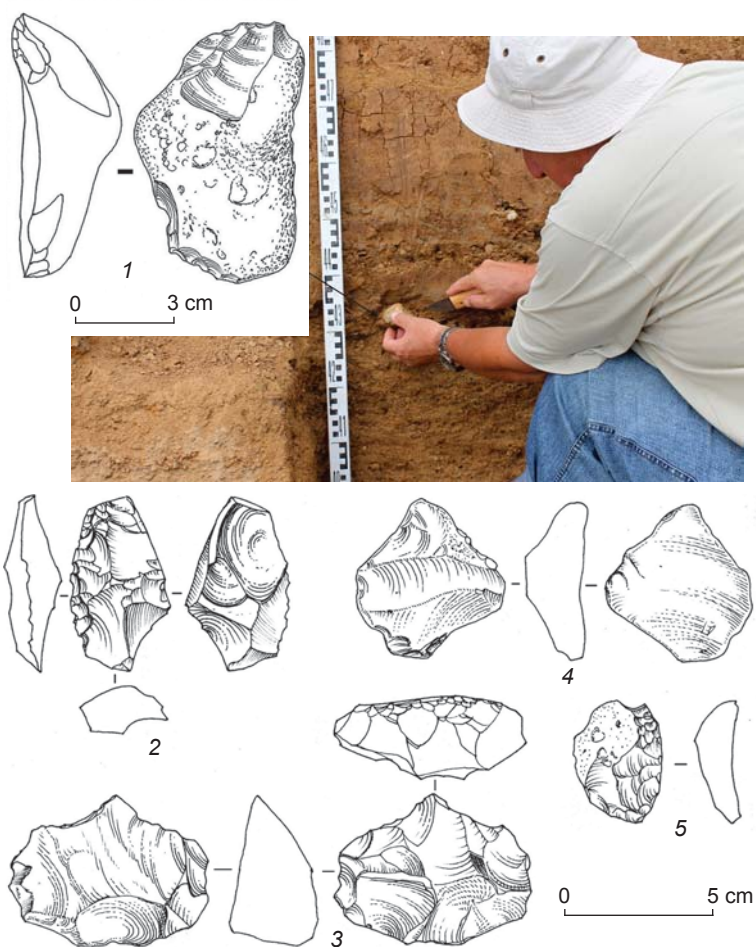


Fig. 3. Chisel-like tool *in situ* from layer 5 (1), Early Paleolithic flint artifacts collected on the beach (2–5), Nikolaevo-Otradnoye II.

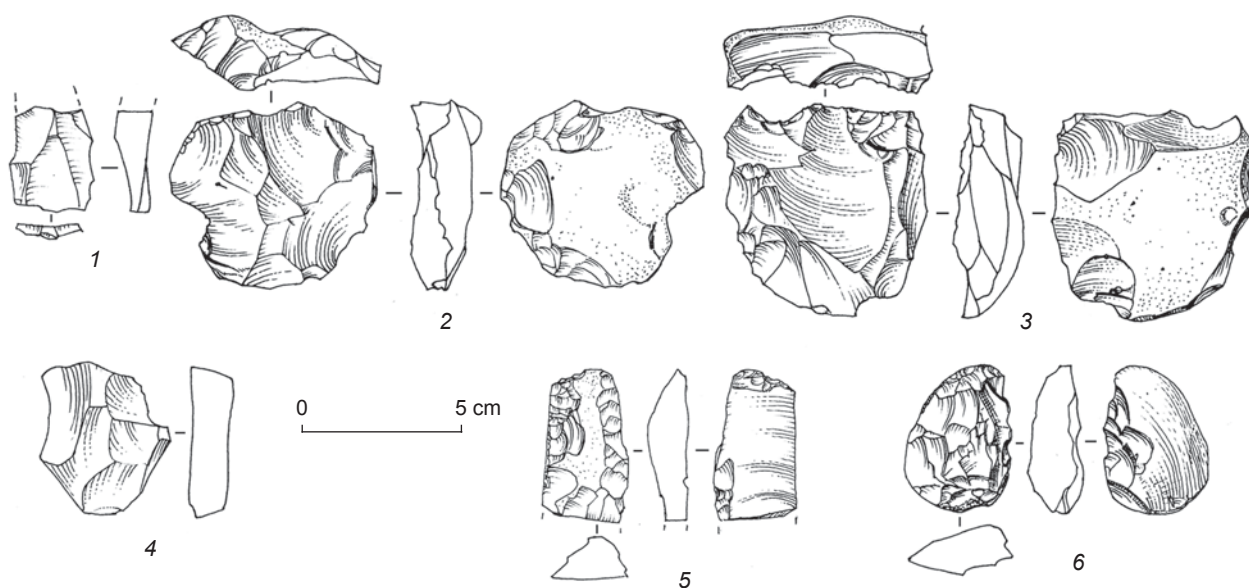


Fig. 4. Flint artifacts of Middle Paleolithic appearance collected on the beach, Nikolaevo-Otradnoye II.

a double (Fig. 4, 5) and a single longitudinal side-scraper with signs of core thinning, longitudinal convex side-scrappers on primary and backed flakes, and a partially bifacial asymmetric tool (Fig. 4, 6).

## Discussion

The subaqueous deposits of the Nikolaevo-Otradnoye II site (MIS 9–11, ca 420–270 ka BP) manifest the features typical of the initial stage of the peopling of the Northeastern Azov and Lower Don regions. This long phase of the early history of the region is documented by the Early Paleolithic (pre-Mousterian) sites of Gerasimovka on the banks of the Mius estuary, as well as Khryashchi and Mikhailovskoye in the lower reaches of the Seversky Donets (Praslov, 1968). The Gerasimovka site on the left bank of the estuary, with the fauna of the Tiraspol complex (ca 800–400 ka BP), is considered to be the earliest (Praslov, 1995). G. Bosinski linked the Gerasimovka complex with the period of settlement in Eurasia ca 780–500 ka BP (1996). According to the latest data, the Acheulean (according to V.E. Shchelinsky) Khryashchi site in the lower reaches of the Seversky Donets belongs to the Likhvin climatic rhythm (MIS 9–11) (Shchelinsky et al., 2020: 66), that is, is contemporaneous with the site under discussion.

The Nikolaevo-Otradnoye II site is important because its evidence, with traces of the Early (by regional standards) Middle Paleolithic, originates from the deposits of earlier than 243–191 ka BP (MIS 7). In the 1980s, there were many discussions on the criteria for attributing the Middle Paleolithic from the traces of the Levallois technique of primary reduction (Bosinski, 1982), the appearance of tools made of flakes (Tuffreau, 1982), and the disappearance of large chopping tools. While the definition of the “Middle Paleolithic” is conventional, these criteria have proven to be effective in identifying and characterizing different regional models of Paleolithic development. All regional reports on the Middle Paleolithic of the Russian Plain and Crimea (Sitnik, 2000; Kolesnik, 2003; Chabai, 2004) mentioned the occurrence of industries with Levallois features in lithological-stratigraphic deposits of no earlier than 123–109 ka BP (MIS 5e). In Western Europe, the Early Middle Paleolithic sites were dated within MIS 7 and 8 (Kozłowski, 2016: Fig. 1). Well-dated Middle Paleolithic complexes from the lower layers (15, 14) of Denisova Cave in the Southern Altai (Derevianko, Shunkov, Kozlikin, 2020) belong to MIS 7.

## Conclusions

Generally, the assumption on the origin of the Middle Paleolithic complex of Nikolaevo-Otradnoye II from the deposits below buried soil that dates to 243–191 ka BP (MIS 7) does not contradict the dates of the Early Middle Paleolithic complexes from the western part of Eurasia within MIS 6–8. It should be admitted that peopling of the Northeastern Azov region in the Early Middle Paleolithic occurred in the general context of multi-vector settlement across Eurasia. The hominin species from the early stage of the regional Middle Paleolithic in the southern region of the Russian Plain remains unidentified to this day. The late stage of the regional Middle Paleolithic (MIS 5, 4) is represented by a single paleoanthropological find—a tooth of *Homo neanderthalensis* from layer 4 of the Rozhok I site at the mouth of the Mius estuary (Zubova et al., 2022a: 142; Zubova et al., 2022b).

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