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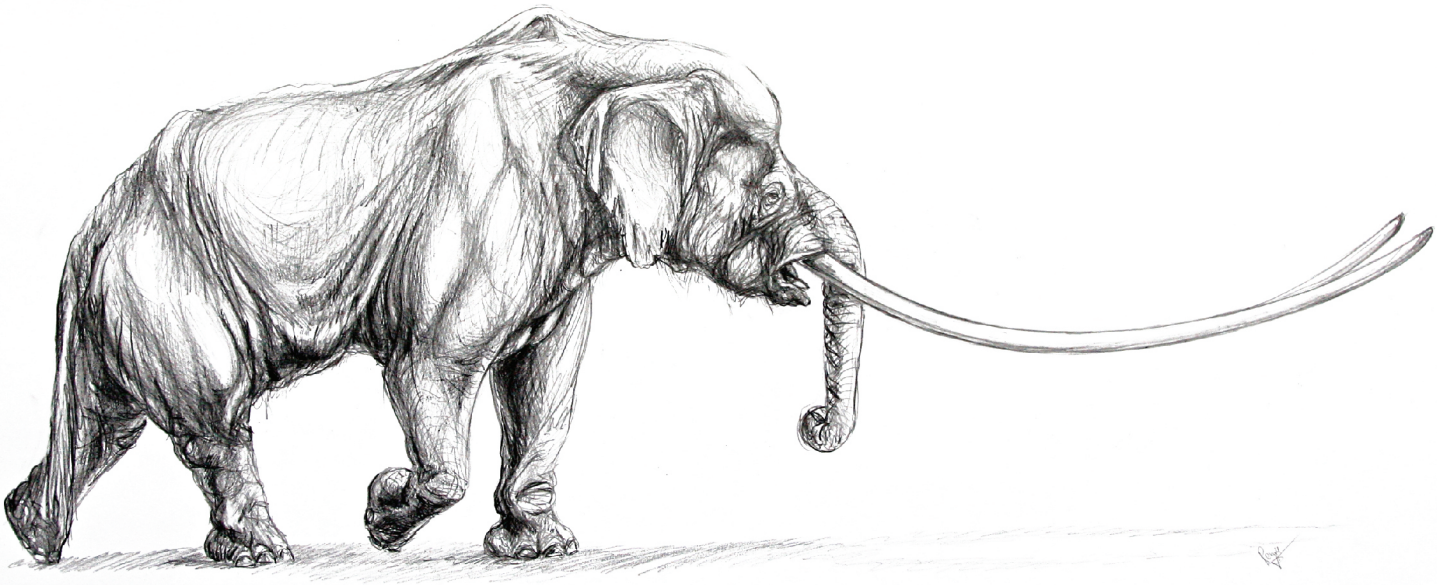

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ABSTRACT BOOK

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Last Glacial Maximum mammoth fauna of the Krasnoyarskaya Kurya site (southeastern part of the West Siberian Plain)

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The Krasnoyarskaya Kurya site (N 57o13.5/; E 87o37.35/) is located in the Chulym River valley in the southeastern part of the West Siberian Plain. In 2003–2005 an area of more than 2000 m^2 at the site was destructed and looted by illegal diggers, who established dozens of dug holes and tunnels at the site unearthing more than 4000 bones and teeth from approximately 30 mammoths, including two embryos, together with horse, reindeer, wolf and rodent bones (Boiko et al., 2005; Maschenko, 2010). During these illegal excavations, hundreds of poorly preserved remains were destroyed and all associated information was lost. Such non-professionally collected and incomplete sample provided poor knowledge on the geological and taphonomic features of the site and partly incorrect basic data have resulted in some misleading conclusions in the aforementioned publications.

The complex investigation of the site was initiated by the Paleontological expedition of the Tomsk State University (TSU) in September 2005. The excavation of approximately 133 m^2 has shown three levels within the bone-bearing horizon (instead of two levels, as suggested previously). The bone-bearing horizon was detected at the depth of 1.5 – 3.3 m from the surface. The site has yielded more than 1400 fragments, intact bones and teeth of wooly mammoths, a horse tooth, several hare bones and 40 skeletal fragments of small rodents. Also, the lower bone-bearing level has yielded 14 chalcedony artifacts, at least 5 ivory and bone artifacts and dozens of burnt bone fragments. Furthermore, local citizens have passed two polar fox mandible fragments and two Paleolithic artifacts, which had been recovered from the site. These fossils and artifacts have formed the collection 201/KK presently stored in the TSU Paleontological Museum.

The large number of mammalian remains, including anatomical skeleton fragments and associated Paleolithic artifacts determine the uniqueness of the Krasnoyarskaya Kurya. In 2011 drilling works revealed the actual size of the burial area which is larger than 5000 m2, which makes this site one of the largest mammoth "cemeteries" of West Siberia, alongside with the sites of Volchia Griva, Shestakovo and Lugovskoye (Leshchinskiy, 2006). The field research and radiocarbon dates (~20 ka BP) suggest that the accumulation of bones at Krasnoyarskaya Kurya took place during the early part of the Last Glacial Maximum (LGM).

The subaquatic micro-topography and the associated processes determined the specific formation of the site.

Fig. 1. The lower level of the bone-bearing horizon of the Krasnoyarskaya Kurya site, West Siberian Plain, Russia (bones annotated with **m** belong to the middle level). Arrows point to the fastening elements of the looting tunnel made by illegal diggers, the dotted line marks the borders of the disturbed sediments.

The accumulation of the lower bone-bearing level (Fig. 1) took place on the bottom of an oxbow lake during the final stage of the development of this lake. Apparently, the lake was temporarily drained and mammoth remains were exposed and became available to ancient humans. The middle level was formed during the deposition of alluvial sand, which represented a floodplain scroll/natural levee or an islet. The taphonomic analysis suggests that many mammoth remains were reworked and redeposited from the underlayment. The higher stage of weathering on the bone surfaces and the frost cracks in the sediments suggest that draining and a stratigraphical hiatus occurred during the LGM (~20–18 ka BP). The upper level was formed with the partial destruction of the underlayers and the reworking of the skeletal remains, which is indicated by the comparatively few fragmented remains and a worse state of preservation of the bone surfaces.

The lower and middle levels contain rodent skeletal fragments in situ. These represent oval clods (up to 4×1.5×1 cm) containing a mixture of host sediments and skeletal parts, sometimes from several individuals. Undoubtedly, these clods represent pellets of predatory birds. The pellets are mostly concentrated around mammoth cranial fragments and tubular and flat bones. It seems that birds regurgitated the pellets sitting on exposed elevated surfaces. Rodent remains mostly demonstrate a good preservation, which could be explained by primary protection in fur and fast burial. Detailed study of 36 pellets have shown 35 skeletal fragments of *Dicrostonyx* Gloger and 5 fragments of *Microtus gregalis* Pallas. The ecology of the modern representatives of these taxa (Chernov, 1980) suggests that during the LGM, the territory was an open landscape of the so-called mammoth steppe with snow cover of not less than 50 cm thick in isolated places.

The pollen analysis has shown an extremely low content of spores and pollen in the bone-bearing horizon. However, the sediments are abundant in silicate micro-remains: sponge spicules, fragments of pennate diatoms and phytoliths. The few autochthonous spores and pollen grains have been classified into two categories: miospores with the thick, three-layer exines (Asteraceae and Cichoriaceae); and miospores of plants with high pollen and spore productivity (*Pinus* sp., *Betula* sp. and *Monoletes*). These data suggests unfavorable geochemical burial conditions. Allochtonous miospores from the lower bone-bearing level represent exclusively Jurassic taxa, while the upper level also contains Paleogene taxa, which suggests deep erosion of pre-Quaternary sediments during the uplifting of the mountain belt of Southern Siberia.

Cryoaridization of the climate during the LGM is recorded by the stratigraphical hiatus in the Krasnoyarskaya Kurya section. However, the lowering of the local erosion basis is related not only to the low global sea level, but also to the neotectonic uplifting of the land. These processes led to acidification of geochemical landscapes and subsequent mineral starvation of the large mammals. The results of the paleoecological analysis, X-ray and electron microscopy have shown a high percentage of osteoporosis lesions of ribs (more than 70 %), vertebrae and flat bones in mammoths of all age groups. Cases of osteomalacia, joint diseases and other pathologies have also been recorded. The numerous cases of destructive skeletal changes support the hypothesis of the geochemical stress that affected all the mammoth populations in Siberia during the Sartan cooling (Leshchinskiy, 2009). The location of Krasnoyarskaya Kurya 150 km north from the Shestakovo beast solonetz site suggests the seasonal meridional migration routes.

The petrographic compositions of artifacts have shown that the tools were made of imported raw material. The geological structure of the study area suggests that chalcedony sources might have been located in the Paleozoic rocks of the south of Western Siberia or in the Mesozoic piedmont sediments. This means that humans carried the stones from 100 km away. The artifacts mostly represent 10–15 mm wide blades with sub-parallel edges and unilateral flaking patterns on the dorsal surfaces. Some tools show modification of the edge using the so-called "episodic retouch" or traces of utilization retouch. No traces of flaking from the narrow face have been noted. The closest analogues have been recorded in the Shestakovo and Achinskaya site located 200 km southeast from Krasnoyarksya Kurya. These assemblages represent lithic industries based on small blades dating to the middle of the Late Paleolithic. Hence, the mentioned typological similarities in the lithic artifacts also suggest the north-south migrations of the prehistoric humans whose subsistence strategy depended on large mammals, primarily mammoth.

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References

Boiko, P.V., Maschenko, E.N., Sylerzhitskii, L.D., 2005. A new large Late Pleistocene mammoth's locality in Western Siberia. Short Papers and Abstracts, 2nd International Congress The World of Elephants. Mammoth Site of Hot Springs, SD, v. 4, pp. 22-26.

Chernov, Yu.I., 1980. Zhizn' tundry. Mysl', Moskva.

Leshchinskiy, S.V., 2006. Lugovskoye: environment, taphonomy, and origin of a paleofaunal site. Archaeology, Ethnology & Anthropology of Eurasia 1 (25), 33-40.

Leshchinskiy, S.V., 2009. Mineral deficiency, enzootic diseases and extinction of mammoth of Northern Eurasia. Doklady Biological Sciences 424, 72-74.

Maschenko, E.N., 2010. Age profile and morphology of mammoth from the Chulym River (Teguldet locality, Tomsk region, Russia). Proceedings, IV International mammoth conference. Yakutsk, Russia, 41-53.

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