



Landscapes of the 'Yuka' mammoth habitat: A palaeobotanical approach



Natalia Rudaya^{a,d,*}, Albert Protopopov^b, Svetlana Trofimova^c, Valery Plotnikov^b, Snezhana Zhilich^a

^a Centre of Cenozoic Geochronology, Institute of Archaeology & Ethnography, Novosibirsk 630090, Russia

^b Division for Study of the Mammoth Fauna, Sakha Academy of Sciences (Yakutia), Yakutsk 677007, Russia

^c Laboratory of Palaeoecology, Institute of Plant and Animal Ecology, Yekaterinburg 620144, Russia

^d Novosibirsk State University, Novosibirsk 630090, Russia

ARTICLE INFO

Article history:

Received 6 June 2013

Received in revised form 27 January 2014

Accepted 14 December 2014

Available online 20 December 2014

Keywords:

Yuka mammoth

Pollen

Plant macrofossils

MIS3 optimum

Eastern Siberian Arctic

Tundra-steppe

ABSTRACT

In August 2010, a well-preserved *Mammuthus primigenius* carcass was found along the coast of Oyogos Yar in the region of the Laptev Sea and the mummy was nicknamed 'Yuka'. Frozen sediment samples from the area of skull condyles were collected for pollen and plant macrofossil analyses. The results from the palaeobotanical investigation confirmed that the Yuka mammoth lived during the optimum of the Kargin Interstadial (MIS3). The burial place of the mammoth could have been a small shallow freshwater pond with either stagnant or slowly moving water. The vegetation of the Oyogos Yar in MIS3 optimum was probably represented by zonal tundra-steppe combined with mesic-xeric meadows.

© 2014 Elsevier B.V. All rights reserved.

1. Introduction

In August 2010, a well-preserved woolly mammoth (*Mammuthus primigenius* Blumenbach, 1799) carcass was found along the Oyogos Yar coast near the Kondratievo River (72°40'49.44" N, 142°50'38.35" E; Fig. 1) in the region of the Laptev Sea.

The juvenile female mummy was nicknamed 'Yuka' after the name of the village of Yukagir, whose local people discovered it. The mammoth was found about 4 m above the beach level; the height of the shore did not exceed 5 m. Unfortunately, the first scientists P. Lazarev and S. Grigoriev from the Mammoth Museum (Sakha Academy of Sciences, Yakutsk) only reached the studied site 2 years later, when more than 100 m of the bluff had been washed away; therefore, a taphonomical description was not performed in detail. After its discovery, Yuka spent 2 years in the Yukagir's natural refrigerator ('lednik'). The mammoth carcass was found hanging over a melting ledge in the upper third of a north-facing slope composed of loess sediments from the rich Late Pleistocene fossil-bearing Yedomas (Maschenko et al., 2012; Fig. 2). The Siberian Yedomas consists of ice-rich silts and silty sand penetrated by large ice wedges, resulting from sedimentation and syngenetic freezing, and driven by certain climatic and environmental conditions during

the late Pleistocene and is widespread in West Beringia (Schirrmeister et al., 2013 and references therein). The carcass was transported to the Sakha Academy of Sciences in Yakutsk (Fig. 3).

By analysing the teeth and tusks, Yuka was determined to be approximately 6–8 years old when it died (Maschenko et al., 2012). The mammoth had most likely been attacked by lions or other predators. However, there were no indications that the predators had killed the mammoth. A 40-cm incision was found in the lumbar region and appears to have been made by a sharp implement. Most of the internal organs were missing. The skull, pelvis, ribs and several other bones had also been removed and were placed alongside the carcass. Such injuries might be evidence of the activities of ancient humans. Evidence of the butchery of a mastodon (*Mammuthus americanus*) by Paleo-Indians was described in Fisher (1984) and Fisher et al. (1991). Moreover, Fisher et al. (1991) suggested that the carcass of the Burning Tree mastodon discovered in a small pond in Licking County, Ohio, might have been buried in a shallow lake by humans to keep the meat at a low temperature. However, the appearance of the first people in East Beringia is estimated at 27–28 kyr BP (Pitulko et al., 2004).

The woolly mammoth inhabited the huge area covering the most part of Eurasia and northern part of North America in the Late Pleistocene. The distribution of the Mammoth faunal complex was associated with the spread of a unique Pleistocene biome called the Mammoth Steppe (e.g., Guthrie, 2001) or tundra-steppe (e.g., Tugarinov, 1929; Hibbert, 1982; Yurtzev, 1981, 2001), which rapidly degraded at the Pleistocene/Holocene boundary (Sher et al., 2005). There are several hypotheses for

* Corresponding author. Tel.: +7 383 316 54 11; fax: +7 383 330 11 91.

E-mail addresses: nrudaya@gmail.com (N. Rudaya), a.protopopov@mail.ru (A. Protopopov), Svetlana.Trofimova@ipae.uran.ru (S. Trofimova), mammuthus@mail.ru (V. Plotnikov), snezhny@yandex.ru (S. Zhilich).



Fig. 1. Map of the region studied with the location of the Yuka mammoth's burial place.

tundra-steppe extinction (see review in Zimov et al., 2012); however, the interactions between grazing animals, climate and vegetation are still unclear.

In recent years, because of the high interest of scientists in multiproxy researches of large Pleistocene mammals, local people have reported several frozen mammoth carcasses discovered in Arctic Siberia. Based on the investigations of Siberian mammoth intestines by paleobotanical, chemical and genetic methods, excellent complex studies have been published (Aptroot and van Geel, 2006; van Geel et al., 2008, 2011; Kosintsev et al., 2012a,b). The relationships between mammoths and the early humans of the Eastern Siberian Arctic have also been the focus of study in recent years (Pitulko et al., 2004; Nikolskiy et al., 2011; Nikolskiy and Pitulko, 2013). Nikolskiy and Pitulko (2013) have shown that Upper Paleolithic humans hunted mammoths sporadically to obtain mammoth ivory and consume mammoth meat. It is notable that humans hunted animals of a certain size that were adolescents, with tusks about 100–120 cm and also young adult female mammoths (Nikolskiy and Pitulko, 2013).

A fragment of Yuka's rib was AMS-dated to $34,300 \pm 260 / -240$ ^{14}C (GrA-53289), which corresponds to the termination of the Marine Isotope Stage 3 (also called the Middle Weichselian, Kargin or Molotkov Interstadial). The interval of 44–32 kyr BP is noted for the largest

proportion of radiocarbon-dated mammal bones collected from the Laptev Sea region (Kuznetsova et al., 2004; Sher et al., 2005).

Here, we describe the results of the paleobotanical analyses of the sediment samples from the area of the mammoth skull condyles, with the aim of reconstructing the living environment of the Yuka corresponding to the termination of the MIS3 climatic optimum, one of the most controversial periods of the Late Pleistocene in the Eastern Siberian Arctic.

2. Regional setting

The Oyogos Yar belongs to the coastline of the Laptev Sea in the Arctic Yakutia (NE Siberia). It is more than 100 km long and thus is the most extended Quaternary outcrop in North Yakutia, located between Cape Svyatoy Nos in the west and Kondratievo River mouth in the east (Velichko, 1973). The eastern part of the Siberian Arctic has been free of inland glaciations since at least the Late Saalian (ca 160–140 kyr BP; Svendsen et al., 2004). The $^{230}\text{Th}/\text{U}$ dating of frozen peat in the permafrost deposit at the southern cliff of Bol'shoy Lyakhovskiy Island located 70 km to the north of the studied site has shown that permafrost has been preserved there for at least

Download English Version:

<https://daneshyari.com/en/article/4750238>

Download Persian Version:

<https://daneshyari.com/article/4750238>

[Daneshyari.com](https://daneshyari.com)