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Steppe species in the Late Pleistocene and Holocene small mammal community of the Urals

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ABSTRACT

Finds of steppe mammal fossils in Pleistocene-dated deposits in regions situated hundreds/thousands kilometers apart from their modern distributions are considered as markers of certain events in climate and landscape dynamics in North Eurasia during the late Pleistocene. Fossil data were used to examine peculiarities of area shifting in several species of the steppe mammal communities in response to the climate and landscape dynamics of the late Pleistocene and Holocene intervals. The main attention was paid to the data from the Ural region. The main idea of this study was to reveal regularities of distribution concerning some species of small mammals representing steppe biota found in Late Pleistocene and Holocene sediments in the Urals. The research concentrated mainly on the northern border position limiting these species' ranges during different time intervals.

1. Introduction

Late Pleistocene distribution patterns of small mammal steppe species were shown to differ significantly from today (Markova et al., 2008). Northern and western limits of the areas occupied by the narrow-skulled vole (*Microtus gregalis* Pallas, 1779), steppe lemming (*Lagurus lagurus* Pallas, 1773), and steppe pika (*Ochotona pusilla* Pallas, 1769) during the late-Pleistocene are over a thousand kilometers away from their modern positions. Two moments seem to be of special interest in this regard. First of all, invasions of the steppe animals indicate events in the climate and landscape history. On the other hand, invasion of one or another species into some new environments undoubtedly indicates the species adaptive abilities and changes of ecological niches.

The Ural region is of special interest concerning these problems. On both eastern and western slopes of the Ural Mountains, throughout all latitudes from the Arctic seas to the Kazakhstan semi-deserts (over 2000 km in total), numerous karst cavities were found and examined including abundant fossils of Quaternary age. Even during the LGM time practically the whole territory (except the highest peaks) was not covered with ice, whereas in other regions of Europe glaciers made barriers preventing northward spreading of terrestrial mammals.

This article is based on the studies and further generalization of results provided by excavations of several dozens of sites with numerical ages. Modern patterns of the steppe species areas in the Urals have been analyzed, in order to compare them with the pictures registered for the Pleistocene and Holocene intervals. This comparison allows to judge the nature of the factors limiting northward expansion of certain animal species and species groups both nowadays and during the Pleistocene. The main object of this study was to reveal regularities of spread of some species of small mammals representing steppe biota found in Late Pleistocene and Holocene sediments in the Urals. The research concentrated mainly on the northern borderline position limiting these species' ranges during different time intervals.

2. Materials and methods

2.1. Material

Solution of the problem under study can be provided at one or another level of accuracy. The latter was shown to depend upon several factors, i.e. the amount of examined bone fossils, number of sites which provided the collections for examination, and the selected way of joining of data into series of spatial and temporal groups.

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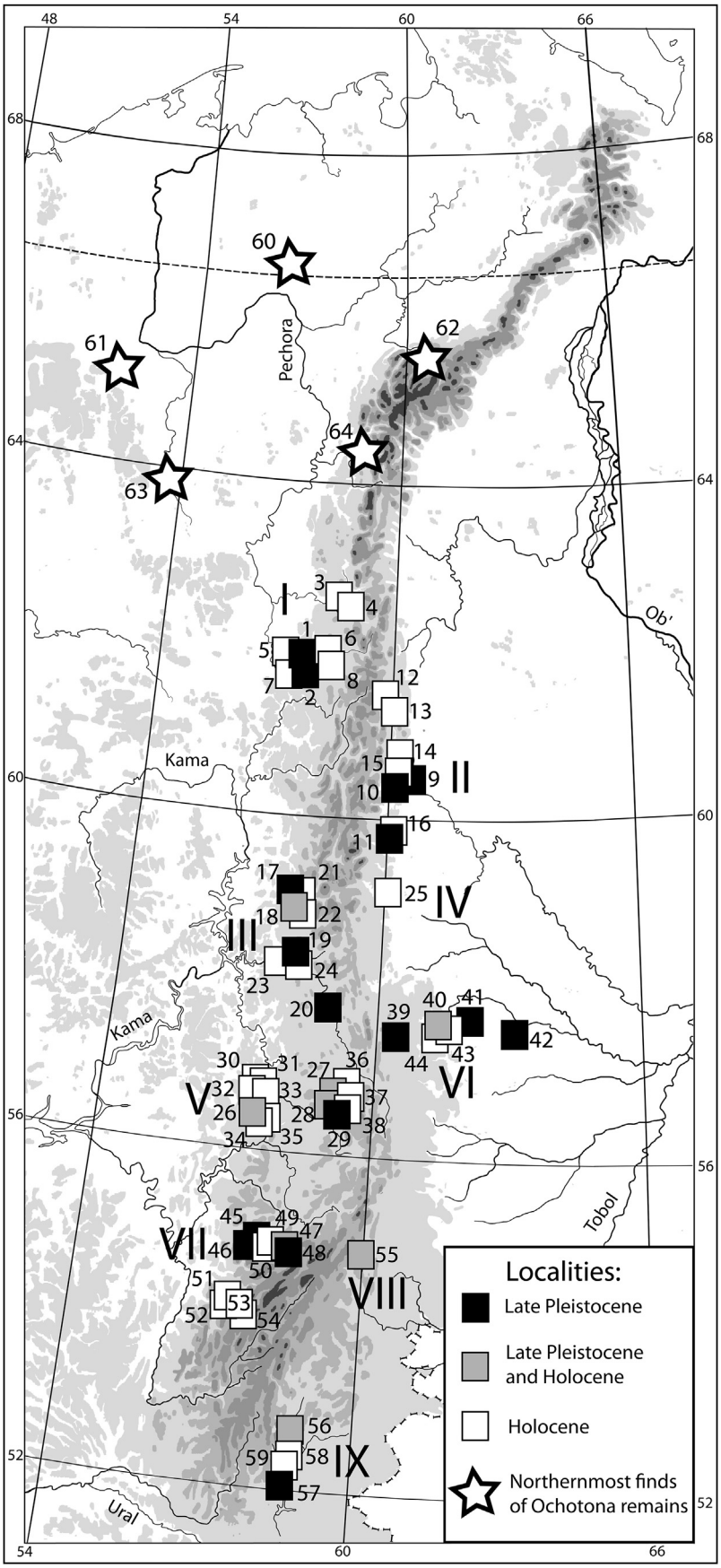

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