

Sborník geologických věd	Antropozoikum 23	Pages 199–202	1 fig.	– tab.	2 pls.	ČGÚ Praha 1999	ISBN 80-7075-272-6 ISSN 0036-5270
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Physiographic distribution regularities of palaeolithic sites in the Altai area

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Received December, 1997

Key words: Altai Mountains, Geomorphology, Transitional zones, Natural adaptation, Palaeolithic

BARYSHNIKOV, G. Ya. - MALOLETKO, A. M. (1999): Physiographic distribution regularities of palaeolithic sites in the Altai area. – Sbor. geol. Věd, Antropozoikum, 23, 199–202. Praha.

Abstract: Analysis of the spatial distribution of palaeolithic sites on the territory of Siberia, the Russian Far East and North-East shows that most of them are situated within the transitional zones located between the Altai and Sayan mountains and the northern lowlands, in an area with a topographic relief of 300–1000 m absolute altitude. Apparent regularities support the model that the highest concentration of Pleistocene occupation sites within these geomorphological zones reflects the best environmental adaptation of early people to particular habitats. This spatio-topographic pattern is valid for both open-air as well as cave sites concentrated in the Altai foothills.

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INTRODUCTION

Systematic geomorphological studies of regional mountain systems in north-central Altai have provided the basis for a new concept of structural geomorphological formation in terms of so-called compensation zones (BARYSHNIKOV 1992). These zones represent the Earth surface relief located between actively geo-tectonically rising mountain massives and retreating lowland depressions. These transitional geomorphological zones are located on the periphery of southern Siberian mountain systems forming a topographical belt on average 75–150 km wide, narrowing or expanding in respect to specific local physiographic conditions, with absolute elevations 300–1000 m a.s.l.

Analysis of the spatial distribution of most palaeolithic sites in the territory of Siberia, the Russian Far East and North-East shows that all sites are situated principally within the transitional zones close to the mountains. This fact corroborates the hypothesis that early people had a physiographic dependence in respect to their adaptation to the natural environment what did not allow them to occupy mountain areas more than 1000 m a.s.l. for a prolonged period of time (BARYSHNIKOV - KISELEV 1993). Studies on the physiological adjustment of the present inhabitants of the mountain regions throughout the world suggest significant biological changes in the human organism, including blood-pressure and oxygen intake reduction, and increases of hemoglobin and blood plasma (LENFART 1973, MIRRAKHIMOV 1979). Psycho-physiological studies of respiratory effects of high altitude hypoxia have provided evidence of deterioration of many functions of the human

body, including sight, memory, reasoning and perception, and deficiency of certain microelements in nutrition (McFERLAND 1953, VISHNEVSKII 1979). These facts indicate that high altitude adaptation requires a significant degree of energy mobilisation in the human organism, implying that this particular geomorphological environment is not favourable to biological evolution of people in the long term.

In respect to patterned regularities in the spatial distribution of the Pleistocene occupation sites, the above facts provide the principal reason for demographic sparsity or even reduction in the high-altitude regions. These conclusions are also supported by the topographical location of the palaeolithic sites in the Gorno Altai area. On the basis of this model, it is believed that majority of the early sites may be anticipated in the transitional zones on the periphery of the Altai and Sayan Mountains, whereas Early and Middle Palaeolithic discoveries in the high mountains beyond the foothills are much less likely.

The following is a short summary of the principal palaeolithic sites in the Altai region in terms of their geomorphological location within the present ecosystem as well as the geological context of early cultural records. Palaeoenvironmental data provide a base for spatial reconstruction of past environments and early human habitats in this part of southern Siberia. Appearance of some other isolated sites outside the delimited area of the above defined transitional zones does not contradict the dependence of early human communities on topographic settings. In general, most palaeolithic sites do not occur above 1000 m a.s.l., and the sites are situated in or close to river valleys and intermountain depressions.

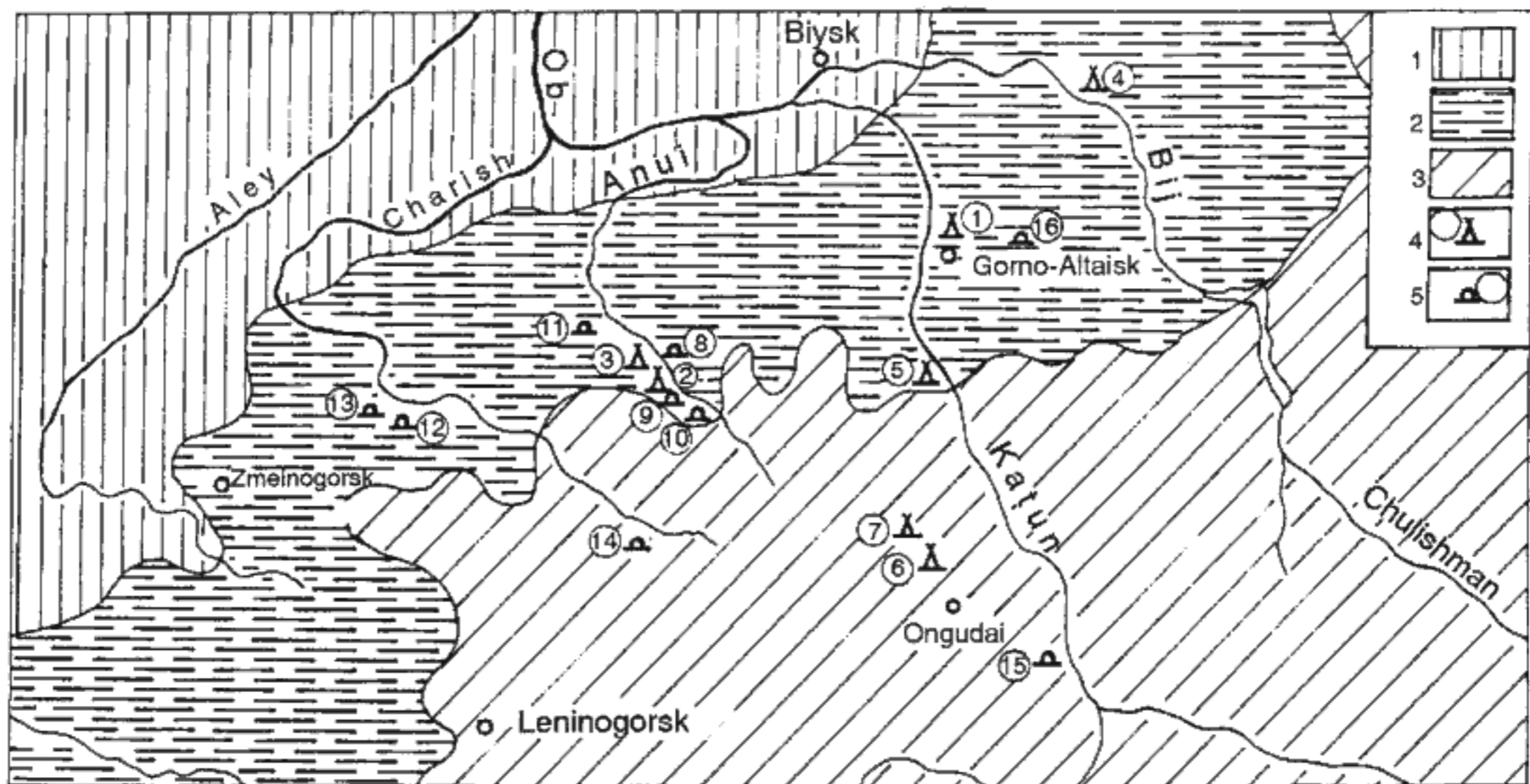


Fig. 1. Location map.

1 – Pre-Altai Plain; 2 – Altai foothills (transitional zone); 3 – Gorno-Altai Mountains; 4 – Open-air sites; 5 – cave sites.

Sites: 1 – Ulalinka; 2 – Ust' Karakol; 3 – Anui I; 4 – Dmitrievka; 5 – Tytkesken'; 6 – Kara-Bom; 7 – Tjumechin I and II; 8 – Denisova Cave; 9 – Kaminnaya Cave; 10 – Razboynischiya Cave; 11 – Okladnikova Cave; 12 – Strashnaya Cave; 13 – Lobovo Gienny Cave; 14 – Ust' Karakol; 15 – Maloyalomanskaya Cave; 16 – Iulchakskaya Cave.

PLEISTOCENE OCCUPATION SITES, GORNO ALTAI AREA

In the Gorno-Altai area, the Pleistocene archaeological localities are represented by both open-air as well as cave sites (Fig. 1). The former include, among others, the Ulalinka, Ust' Karakol, Anui I, Dmitrievka, Tytkesken', Kara-Bom, Tjumechin 1 and 2 sites; the latter the Denisova, Kaminnaya, Razboynischiya, Okladnikova, Strashnaya, Lobovo Gienny, Ust'-Kanskaya, Maloyalomanskaya and Iulchakskaya caves. The discussion below principally concerns the most relevant locations investigated by the authors.

PRINCIPAL ARCHAEOLOGICAL SITES

Ulalinka

The Ulalinka site, discovered by A. P. OKLADNIKOV in 1962, represents one of the most intriguing Palaeolithic sites in southern Siberia; the authenticity as well as the age of which have been a subject of debate for the past decades. The site is located on the south-eastern margin of Gorno-Altai, the capital of the Gorno-Altai Republic, on the left bank of the Ulalinka River. Two radically different views on the antiquity of the site, archaeologically manifested by a rudimentary flaked stone industry, have estimated the lithic record to be either more than

1.5 Ma or less than 100 ka old. According to MALOLETKO (1972), the alluvial terrace, incorporating the lithic record is ca. 40–35 ka old. Similarly, a Late Pleistocene age (ca. 90 ka BP) was estimated by TSEITLIN (1979). On the contrary, a rather early date was suggested by OKLADNIKOV (1964), the principal site investigator, presenting this site as the earliest occupation found in Siberia. Following the initial investigations, multidisciplinary (geoarchaeological, palaeontological and palaeomagnetic) studies suggested an age of 690 ka to 1.5 Ma BP (OKLADNIKOV – RAGOZIN 1978, 1982, RAGOZIN 1982). Nevertheless, the most recent geological studies (BARYSHNIKOV 1990) do not confirm this age estimation, in so far that the artefact-bearing deposits are clearly Late Pleistocene as indicated by detailed field investigations as well as laboratory analyses. The key 5 m high profile of the alluvial sandy gravel terrace includes some lenses of greyish clay with pollen assemblage represented by birch, spruce and some spores. A more recent, rather than Early/Middle Pleistocene, age for the river terrace is also based on the palaeocarpological material derived from alluvial deposits on the left side of the river, some 3 km upstream of the sites. From a layer of greyish clay, incorporating organic remains at a depth of 2.7 m below the present surface, great amounts of various seeds have been found. These are indicative of a grassy meadow with herbs and some bush with isolated trees. The principal component of the fossil pollen assemblage includes mesophytic grass forms (*Cyperaceae*, *Urti-*

caceae, Chenopodiaceae, Ranunculaceae, Rosaceae, Hypericaceae, Violaceae and Compositae), spores (Pteridophyta, Bryales) as well as some aquatic taxa (*Sparangium ramoseum*, *Heleocharis palustris*) characteristic of swampy settings. Arboreal species are represented by *Pinus*, *Betula* and *Salix*. All the above forms are present in the area throughout the Holocene. In summary, the palynological analysis and geomorphological investigations suggest that the Ulalinka River artefact-bearing terrace formed relatively recently, not earlier than 10–13 ka BP. Furthermore, the site section does not show any signs of the presence of much older strata of the Early Pleistocene Kochkov Formation (2.5–1.5 Ma BP) or Middle Pleistocene deposits (400–300 ka BP) as previously argued by OKLADNIKOV and RAGOZIN (1982), as well as by ADAMENKO (1972) and ADAMENKO (1974). These old deposits are found at the very base of the terrace, but their association with the palaeolithic stone industry has not been demonstrated.

Ust'-Karakol

The Ust'-Karakol site is located at the foot of a slope above the confluence of the Karakol and Anui Rivers in the Anui River valley, 4 km north of the Chernyi Annui village (Ust'-Kanskiy Rayon, Republic of Gorno Altai). The site has been investigated since 1986 through a series of large sections and by detailed palaeoenvironmental (palaeontological, palynological, palaeocarpological and pedological) studies. According to the present geological data, most loessic sediments and colluvial slope deposits, forming the site geological context, accumulated during a rather cold and dry climate of the early part of the last glacial (Sartan) stage as fixed by radiocarbon dates of 28 700 ± 850 yr. BP (SOAN 2314), 31 410 ± 1160 yr. BP (SOAN 2515) and 29 900 ± 2070 yr. BP (IGAN 837). The temperature regime seems to be fairly stable over a longer period of time, whereas a humidity peak culminated around the interstadial of 30 000 yr. BP as evidenced by proluvial and colluviated sediments.

Anui I

The Anui I open-air site, discovered in 1983 by Derevianko and Markin in the course of the archaeological survey of the Russian Academy of Sciences, is situated in the Anui River valley, ca. 380 m southeast of the Denisova cave in the Altai foothills. In the following years, a series of large scale sections (up to 60 m long and 8 m wide) produced palaeolithic material analogous to that gained from the previous excavation of 8 x 9 m cut to a depth of 6 m (DEREVIANKO - ZENIN 1990). The site was subjected to complex multidisciplinary studies and subsurface geophysical survey techniques that found a burial under colluvial slope deposits above the lower river terrace. According to the geological position

as well as the radiocarbon dates, the Anui I site can be well correlated with the nearby Ust'-Karakol locality.

Dmitrievka

The Dmitrievka site is located on the right bank of the Biya River between the Ushna River and its tributary, the Salazan, on the southwestern margin of the Sukharevskaya Plateau, forming a narrow (300–400 m) topographic elevation. The archaeological site, exposed by the excavation, is about 49.5 m above the Biya River. In respect of geochronological as well as contextual data, the palaeolithic occupation may be broadly comparable with the Upper Palaeolithic sites in the Anui River valley. Close similarities exist, particularly between the Ust'-Karakol site in the specific topographical location on a slope near the confluence of two rivers. In both cases, the archaeological horizons are incorporated in aeolian (loessic) sediments, intercalated with lenses of proluvia and colluviated palaeosols that formed on the loessic substratum. Contextually, analogous cultural horizons are also found at other places. Nevertheless, according to the radiocarbon dates, both sites cannot be considered as contemporaneous. Evidently, a preference for this particular site location within the Last Glacial periglacial landscape was determined by other variables over a longer period of time, being directly related to lifeways and natural adaptation of the palaeolithic people, and the specific function of the occupation site.

Tytkesken'

The archaeological complex of Tytkesken' is located at the right bank of the Tytkesken brook on a lower alluvial terrace in the Katun' River valley in Gorno Altai. It includes three palaeolithic sites Tytkesken' 2 and 3 and Nizhne Tytkesken'skaya Cave. Site Tytkesken' 1 is an Iron Age burial mound with several kurgans.

The multilayer site Tytkesken' represents a long-term prehistoric occupation covering a time span from the Upper Palaeolithic through the Ceramic Neolithic to the Bronze Age period. Complex geoarchaeological studies, including granulometrical, petrographical and spectral analyses of sediments and palaeoenvironmental (palynological, palaeontological and palaeocarpological) investigations carried out at the sites allowed a detailed palaeogeographical and palaeoecological reconstruction of the Upper Palaeolithic as well as the subsequent human occupations.

Tytkesken' site 3 is situated ca. 400 m from the confluence of the Tytkesken' brook and the Katun' River on the right side of the valley on the third terrace, ca. 30–32 m above the Katun' River on a small platform elevated 10 m above the Tytkesken' brook. It was the first site, found in 1988 on the basis of the above mentioned outlined palaeolithic site distribution model within the

transitional zones and by means of the corresponding archaeological survey techniques (BARYSHNIKOV 1986, PANYCHEV et al. 1988). According to the geomorphological setting, the age of the site should not exceed 15 ka BP, as confirmed by subsequent excavation and dating. The archaeological horizon buried 1.2 m below the present surface furnished a lithic assemblage, including flakes, nuclei and some finished tools used as scrapers. Palaeontological studies of fossil fauna as well as geochronological analyses confirmed the original age estimate of the site.

CONCLUSIONS

The short characteristics of the open-air palaeolithic sites in the Altai area in terms of their topographic (palaeorelief) setting and geological context confirm the present model on regularities of spatial distribution of the Stone Age occupation sites within the transitional geomorphological zones related to environmental adaptation of early people to their natural habitat. Present geomorphological studies in the Altai area, focusing on the cave sites concentrated in the foothills corroborate the existing theoretical scenario as well as the archaeological evidence.

Acknowledgements

The authors thank to Dr. Jiří Chlachula for the English translation of this contribution.

Recommended for print by S. Vencl

References

- ADAMENKO, O. M. (1974): Mesozoic and Cenozoic of the Steppe Altai. – Nauka, Novosibirsk. (in Russian)
- ADAMENKO, R. S. (1972): Mammal fauna from the cultural horizon of the Ulalinka palaeolithic site. In: *Archaeology and Natural History of the Altai Region*. – Conference Proceedings, 9–12. Barnaul. (in Russian)
- BARYSHNIKOV, G. YA. (1987): Geological-geomorphological method of archaeological site age determination in the Altai Mountains. In: *Quaternary Geology and Palaeolithic Archaeology of Southern Siberia*. – Conference Proceedings, 75–77. Ulan-Ude. (in Russian)
- (1992): Relief evolution of transitional zones in mountain regions. – University of Tomsk Press, Tomsk. (in Russian)
- BARYSHNIKOV, G. YA. - KISELEV, V. D. (1993): Regularities in distribution of palaeolithic sites on the Asian continent. – *News of the Siberian Branch of the Russian Academy of Sciences, History, Philosophy and Philology*, 3, 40–45. Novosibirsk. (in Russian)
- CHIODI, H. (1957): Respiratory adaptation to chronic high altitude hypoxia. – *Applied Physiology*, 10, 81–87.
- DEREVIANKO, A. P. - ZENIN, A. N. (1990): Palaeolithic site Anui I. In: *Complex investigations of palaeolithic monuments in the Anui River Basin*. – Nauka, 31–42. Novosibirsk. (in Russian)
- HURTADO, A. (1964): Animals in high altitudes: resident man. – *Handbook of Physiology, Section 4. Adaptation to Environment*, 843p. Washington.
- LENFANT, C. (1973): High altitude adaptation in mammals. – *American Zoology*, 13, 447–456.
- MALOLETKO, A. M. (1972): On the geological age of the Ulalinka palaeolithic site. In: *Archaeology and Ecology of the Altai*. – Conference Proceedings, 7–9. Barnaul. (in Russian)
- MCFERLAND, R. A. (1953): *Human factors in air transportation*. New York.
- MIRRAKHIMOV, M. M. (1977): *Healing by mountain climate*. – Medicina, Nauka, Moscow. (in Russian)
- MONGE, C. (1943): Chronic mountain sickness. – *Physiologia Revista*, 23, 166–184.
- OKLADNIKOV, A. P. (1964): Siberia in the Early Stone Age. Palaeolithic Period. In: *History of Siberia*. – Nauka, 1, 3–5. Ulan Ude. (in Russian)
- OKLADNIKOV, A. P. - RAGOZIN, L. A. (1978): On the age of Ulalinka – the earliest occupation site in Siberia. – *News of the Siberian Branch of the Russian Academy of Sciences, Natural Sciences Series, Volume 2/6*, 3–6. Novosibirsk. (in Russian)
- (1982): Mystery of Ulalinka. – *Soviet Ethnography*, 6, 115–125. (in Russian)
- PANYCHEV, V. A. - BARYSHNIKOV, G. YA. - ORLOVA, L. A. (1988): Age determination of river erosion in the Gorno Altai using archaeological data and radiocarbon dates. In: *Geomorphology and Neotectonics of the southern part of East Siberia*. – Conference Proceedings, 42–43. Irkutsk. (in Russian)
- RAGOZIN, L. A. (1982): The earliest occupation of Siberia – 1.5 Ma old? – *Nature*, 1, 119–121. (in Russian)
- TSETLIN, S. M. (1979): *Geology of the Palaeolithic of North Asia*. – Nauka, Moscow. (in Russian)
- VISHNEVSKI, N. A. (1979): Hypoxia, ecological physiology of man. Adaptation of people to experimental environment. – Nauka, 333–405. Moscow. (in Russian)