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PALEO BIOLOGICAL METHODS FOR STUDYING THE HISTORY OF EARLY ANTHROPOGENESIS OF FERGANA

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Abstract
The article presents some results of the reconstruction of the paleogeographic development of nature during the late Cenozoic, a geological stage that is closely connected with the history of the formation of man as an anthropological type on the territory of the northern slopes of High Asia and the Fergana region in particular. An integral component of paleogeographic research is "biogeocenosis", which includes a natural complex representing the totality of flora and fauna - "biocenosis". Paleontological sources characterizing the rate of evolution of biogeographical transformations were identified as a result of paleogeographical study of cultural horizons at the historical monuments of the early anthropogen Selungur, Sokh, Chashma, Obzhaz and a newly discovered complex of objects in the eastern part of the Fergana region - Khanobad. Based on the paleogeographic study, the stages of the history of the evolutionary formation of nature, against which the development of the most ancient cultures of mankind took place, are detailed. The research results are a modest addition to the construction of the regional chronostratigraphic scale of the Late Cenozoic on the territory of the northern slopes of High Asia.

Keywords; Paleogeography, Fergana region, High Asia, Tien Shan, Cenozoic, anthropogen, chronostratigraphy, paleobotany, paleozoology, biocenosis.

Introduction and problem statement.

As a result of complex, interdisciplinary studies of the ancient history of mankind, in the mountainous regions of the Tien Shan, Pamir-Alay, as well as in the vast expanses of Turan, Kazakhstan, China and Hindustan, and in recent years in the Caucasus, unique monuments containing stone industry and the remains of the most ancient ancestors of modern man.

The remains of fossil plants and animals, preserved in cultural deposits formed during the periods of life of the most ancient intelligent inhabitants of the planet, allow shedding light on the innermost secrets of the origin of the "origins of human history". On the territory of Central Asia, paleobiological sources of geological eras are rarely preserved, therefore, finds of fossil flora and fauna, anthropological remains, despite

their fragmentation, are of the greatest scientific interest, and in terms of the degree of uniqueness and uniqueness in the knowledge of the ancient history of mankind, they become sensational. A very significant achievement in the study of the origins and further development of the earliest material culture in Central Asia is the discovery in the last quarter of the 20th and early 21st centuries of a number of unique monuments of ancient history on the territory of the Fergana region.

These include the sites of the most ancient inhabitants of the Sokh region, Chashma, Obzhaz, Khanobad and the unique cave monument Selungur, which nature has preserved from grandiose geological and man-made transformations, for future generations of mankind - trying to "know themselves". In administrative terms, the monuments of the emergence and further development of the "origins" of the history of the early anthropogen, which are of universal significance, are located on the territory of Uzbekistan, Kyrgyzstan, Tajikistan, Kazakhstan, China and Hindustan.

In this regard, the relevance is due to the fact that the results of interdisciplinary paleogeographic studies of nature are quite worthy of the world community knowing and having an adequate idea of the history of the formation of unique monuments of the emergence of intelligent activity in the history of mankind, discovered on the territory of the Fergana region.

Multilayer stratified deposits of monuments of the most ancient history of mankind have preserved in their horizons an exceptionally important set of evidence on the history of the complex and mysterious development of the earth's surface. They reflect the regional and local features of the evolutionary development of nature, flora and fauna in periods that characterize the origins of the development of the earliest material and spiritual culture of mankind on planet Earth.

But the most important and so far the only one for the territory of Central Asia is the discovery of anthropological remains of the most ancient great-ancestors of Man in stratified deposits of a unique cave monument of ancient history - Selungur.

In the process of studying the origins of the origin and development of the most ancient culture in the central part of Eurasia, the term "unique" is used repeatedly in this study due to the paramount importance of scientific information. In this regard, it is necessary to clarify the terminological meaning. "Unique" - from "unicum" from the Latin language - "one of a kind, exceptional, great rarity."

The definition of "unique" is most directly related to the monuments of the ancient history of mankind discovered on the territory of the Ferghana region, which, along with the Tien Shan, Pamir-Alay, Hindu Kush and the Himalayas, is included in the system of the greatest mountain structures of High Asia on the globe. The research

region has a long history of paleogeographic development of nature throughout the Proterozoic, Paleozoic, Mesozoic and Cenozoic.

In the Fergana region, the most ancient stages of the history of the early Anthropogen, as well as throughout Central Asia, remained, in essence, closed to primitive archeology. The discovery in the eighties of the twentieth century of a number of monuments of the most ancient history of mankind caused heated discussions on the fundamental issues of the development of the Paleolithic culture and ancient man as an anthropological type. At the center of these scientific disputes were the problems of succession and change of the early stages of the Paleolithic culture and the correlation with these stages of the main anthropological types, the most ancient inhabitants of the Central Asian region.

At present, an additional paleogeographic study of the history of the development of nature during the periods of the early Anthropogen of the Fergana region has been carried out against the background of a wide historical panorama of the history of the ancient Stone Age of Central Asia, Kazakhstan, Hindustan and China. The results obtained subsequently made it possible to open a number of no less ancient complex of monuments Khanobad, on the territory of Eastern Fergana and to determine their significance in the history of the early anthropogen in the interregional plan.

Study of the problem. On the basis of determining the factors of the natural environment, as the place and conditions of habitat, the distribution of species, their range in the epoch of the early anthropogen in the territory of Fergana, a study of local and regional features of the evolutionary formation of the animal world in the periods of the Mesozoic and Cenozoic was carried out. Paleobiological studies of anthropogenic deposits of the monuments of Selungur (Kyrgyzstan), Sokh, Chashma, Obzhaz, Khanobad (Uzbekistan), to a large extent allow us to study the history of the development of flora and fauna, regional features of the formation of landscapes of Ferghana, against the backdrop of the formation of the grandiose mountain systems of High Asia.

The goals and objectives are: 1. To study the local features of the dynamics of tectonic movements and, as a result, paleogeographic and biological transformations on the territory of Fergana during the Paleozoic, Mesozoic and Cenozoic of the genetic sequence. 2. In determining the chronostratigraphic stages of the history of the paleobiological development of nature, against which the formation of the most ancient cultures took place in the zone of the mountain systems of High Asia. 3. In comparison of the chronostratigraphic stages of the paleogeographic development of nature and their connection with the dynamics of tectogenesis, relief formation, with climatic variations, sedimentation, and, as a result, with the evolutionary change in

flora and fauna. 4. Determine the chronological sequence of the development of paleogeographical conditions that constituted the basic background for the formation of historical processes. 5. Develop methods for classifying numerous Stone Age monuments on the scale of the Fergana region, including the Mesolithic and Neolithic epochs.

At the final stages of the paleogeographic study of the history of the development of nature, to determine the basic basis for the autochthonous formation of a socio-biological phenomenon in the Cenozoic era in the territories that are in contact with the ancestral home of mankind on the scale of High Asia. In this regard, the Fergana region deserves special attention, since in terms of its main paleogeographical characteristics it is inseparable from the territory of High Asia, Hindustan, China and the Middle East.

Materials and research methods. Tectonic activity predetermined the features of the formation of paleolandscape zoning in the Fergana region and, accordingly, the development of paleogeographic and environmental conditions. In this plan, special attention is paid to the fact that life forms require a combination of appropriate external factors. The existence of a certain form of life in a time interval means that the environmental conditions corresponded to a certain species. This reasoning allows us to consider the species composition of plants and animals as a reflection of the biotic world, the existence of which corresponded to certain stages of the paleogeographic development of nature, against which the formation of the most ancient cultures of mankind took place.

Consequently, there was an urgent need to study the features of the formation of the vegetation cover, the distribution of certain communities over a long geological history of the development of nature in the genetic and chronostratigraphic sequence. The complex of paleogeographic methods for interdisciplinary research into the history of the early Anthropogen includes a number of categories of natural monuments, which are defined by the term "ecofacts". The facts of the natural environment, which is affected or not by certain human activities. This type of sources differs to a certain extent from the definition of "material culture" or "artifacts", that is, objects created by human hands. In this line of research, ecofacts are part of a wide range of objects preserved from endogenous, exogenous and technogenic transformations, and imprinted in stratified deposits formed in the era of the early Anthropogenic.

Thus, paleogeographic objects of study imply a relative set of acceptable goals and a set of methodological features of their study, which are grouped in a logical sequence. They include paleogeographic, neotectonic, paleobiological, archaeological and a

number of other areas, which, in turn, make it possible to highlight the features of global, regional and local processes and phenomena in the history of the development of nature and society.

The methods of paleontologists in this area of research illuminate the pace of evolutionary transformations of the flora and fauna. The paleontological record testifies to changes in the rate of evolution that accompanies biogeographic transformations. J. Simpson introduced the concept of quantum of evolution - the transition from one adaptive equilibrium to another.

Results and discussions. In the process of studying the history of the formation of the natural environment in the epoch of the early anthropogenous biogeographic methods of research on the territory of the Fergana region, generally accepted taxonomic categories are used. The main biogeographic category is "biogeocenosis", which includes a natural complex, representing the totality of the plant and animal population of the "biocenosis" - a homogeneous area of the territory.

As a result of the study, the criteria necessary for clarifying the time parameters in the process of paleogeographic reconstructions of natural phenomena in the study region were determined. Particular attention is focused on the history of the development of nature in the Cenozoic era, starting from the periods of formation of marine, lagoonal and continental sediments in the research region. The term "development" in this study characterizes the processes of change and the emergence of newer phenomena. The history of the paleogeographical development of nature during the periods of the Cenozoic is characterized by qualitatively new stages in the formation of the earth's surface. There is a development of facial features of landscapes, the corresponding lithology of surface rocks, the nature of the relief and moisture, the microclimate, the soil system and biocenoses.

One of the most important components of the landscape are combinations of plant and animal species. In this regard, a study was made of the interdependence of the flora and fauna, their influence on each other, as well as the ever-increasing change in landscapes in chronological sequence under the influence of exogenous and endogenous transformations of the natural environment of the Fergana region.

The disappearance of some elements of the natural environment and the creation of others, in the process of paleogeographic transformations of the earth's surface, lead to a radical change in the flora and fauna. Certain stages of changes in the components of the flora and fauna are considered as chronostratigraphic milestones in the history of the development of nature in the most ancient periods of the territory of the Fergana region.

The study of regional features of the development of natural processes in historical sequence, using paleogeographic methods, including phytogeography and zoogeography, considers a spatial unit - "area", which means the area of distribution of a species, genus, family of plants and animals. The formation of territorial complexes of organic life - biogeocenoses occurs according to the known general laws of the development of nature. In this regard, paleogeographic research methods include the definition of stages in the development of general patterns of formation of biogeocenoses on the territory of the Fergana region.

In this regard, significant results in the history of the development of the natural environment have been obtained by a team of botanists. In the region of R.V. Kamelin, F.O. Khasanov studied colossal factual material on the main floristic complexes, systematized from the standpoint of modern paleobotanical nomenclature. A comprehensive floristic comparison of the regions and districts of Iran, Afghanistan, Iraq, the Altai Mountains, Tarbagatai, as well as Dzungaria and Kazhgaria was made. Floristic links with the Mediterranean, East Africa, Arabia and East Asia have been determined.

As a result, the contours of the historical panorama of the development of flora in the Fergana region of research were created. The age of the flora formed on the basis of the subtropical floras of the Upper Cretaceous and Paleogene times and further evolutionary formation in the Neogene and Quaternary period have been established. In connection with the tectonic transformations of the natural environment, the formation of altitudinal landscape zonality takes place, which had a direct impact on the development of the organic world. In paleobotanical studies, a special place was given to a comprehensive study of the geographic environment in its genetic and chronostratigraphic sequence, directly and associated with it, the differentiation of vegetation against the background of geological history. In this interpretation, florogenesis and cenogenesis are inseparable from each other, both processes are based on a single law of adaptation to changes in the natural environment.

Each type of vegetation is characterized, first of all, by the composition of species, the unity of their origin and adaptation to certain conditions, in relation to the environment. A characteristic feature of the ecological-historical direction in the classification of vegetation, defined in the anthropogenic deposits of the Selungur cave, is the consideration of floristic, ecological and geological, tectonic and climatic factors.

In the process of archaeological research, 49 samples were taken from the thickness of the cave deposits of the Selungur cave site. The spore-pollen analysis and elucidation of the nature of the vegetation was performed by R.A. Khalmukhamedova

at the Institute of Botany of the Academy of Sciences of Uzbekistan. Paleobotanical research was also carried out at the Institute of Geography of the Russian Academy of Sciences. This made it possible to obtain complementary and mutually controlling data on the history of the evolutionary development of the natural environment during the corresponding geochronological period.

Chronological detailing of the periods of habitation of the Selungur cave is associated with the latest orogeny. In the process of studying the history of the formation of cave sediment horizons, attention was drawn to the most characteristic feature - the presence of pine grains - Pinus. The involvement of Pinus in the analysis was explained by the fact that this genus has an extremely slow evolution process, and it is absent in the flora of the Middle and Late Pleistocene in the study region. Among conifers, pine pollen of the subgenera Haploxylon and Dyploxilon was also noted. Piceae, Pinus s. gen. Hap., Pinus s. gen. Dip., Betula, Corylus, Alnus, Juglans, Humulus, Tilia, Quercus, Carpinus. Paleobotanical studies have determined that during the periods of habitation of the early anthropogenic monuments, in the vicinity of the Selungur cave, species of spruce, hemlock, linden, elm, oak, alder, tamarisk, hornbeam, hornbeam, hop-hornbeam, hop, grape, walnut grew.

Many species of tree species discovered in the deposits of the Selungur cave site are elements of the tertiary flora. In the modern flora of Central Asia, they are relics, as evidenced by their small isolated areas. The noted ancient elements were the source of the emergence of new series of forms, the development of which should be attributed to the next period of the geological history of the flora under consideration. A comprehensive spore-pollen and paleobotanical analysis allows one to reconstruct the dynamics of the development of the natural environment during the accumulation of stratified anthropogenic deposits of the Selungur cave in terms of the composition and nature of fossil vegetation, and serve as an important bioindicative material for the reconstruction of paleogeographic conditions. (Table 1).

The results of paleobotanical studies, in turn, showed that the change in vegetation cover could not but affect the fauna.

The paleozoological study of bone remains of the fossil fauna, discovered in the deposits of the ancient Paleolithic cave site Selungur, is the next component in the study of the paleogeographic situation of Fergana. Along with the change in the composition of the fauna, due to the evolutionary development of various groups of animals, there may be a change in species and genera. Depending on the significant paleogeographic restructuring of the landscape, migrations occur, shifting the range of one or more groups of mammals. The relative morphological stability of individual species of fauna depends on the preservation of relatively stable environmental

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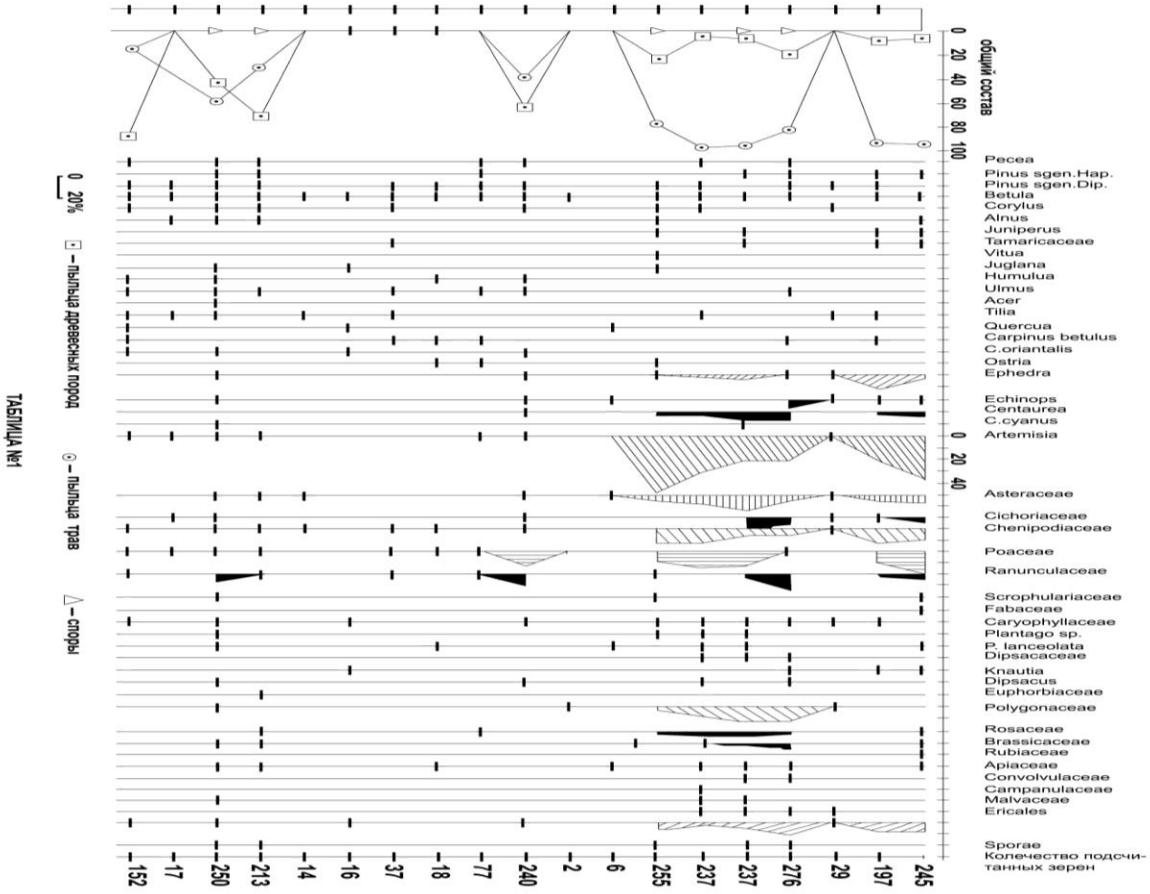
conditions, which at the turn of the Pliocene and Pleistocene underwent significant paleogeographic transformations.

Faunistic complexes are proposed to be considered as a community of animal species characteristic of certain periods of time and for certain territories. Community means biocenosis in the broadest sense of the term.



The duration of the existence of various species of animals that are part of the faunal complex may correspond to the time of existence of this complex. In the latter case, such species are considered “leading”, and the complex corresponds in time to the biozone of this species.

The biostratigraphic faunistic complex is considered as a complex of mammalian species that does not repeat in time, is characteristic of each paleozoogeographic region and differs from other similar complexes - older or younger, by the presence of its own stage of evolutionary development.

In the process of reconstructing the paleogeographical conditions on the territory of South Fergana, in addition to individual species and genera of vertebrates, their communities were also studied, which make up a well-defined landscape biocenosis. Along with this, the pace of evolution of vertebrates is also taken into account, since over time their organization increased and ecological diversity increased.

In the Ferghana region, as the ecological situation changed and under the influence of natural and anthropogenic factors, at certain geochronological boundaries, a change took place in the theriocomplex. In the scientific definition, fauna is a collection of animal species living in a certain territory or water area. The fauna of a certain geographical area, formed in the process of historical development from various groups of animals, constitutes a faunistic complex.

In the anthropogenic stratified deposits of the Fergana monuments, the dominant groups include numerous genera of small mammals, which are considered “guiding” for drawing boundaries in biostratigraphic definitions. The existence of animals in limited zones and provincial areas against the background of large areas of dominant groups makes it possible to understand the paleogeographic and paleozoogeographic features of the territory. The available materials on animals, which have a small number and small ranges, are used to a much lesser extent for biostratigraphic determinations, due to the rare occurrence of their remains.

In the process of studying the change in natural conditions, the features of the transformation of the flora and fauna, determining their temporal parameters, reconstructing the evolutionary changes in the natural environment, not individual species are used, but their communities that make up a well-defined landscape geobiocenosis. In this regard, a study was made of the bone remains of small mammals from the Selungur site, as the dominant group. In total, several thousand bone remains were found, of which about a thousand are definable to the species. The definitions were carried out by A.K. Markova and M.A. Yerbaeva.

Findings. Conducted by A.K. Markrva's studies of the remains of fossil rodents from the cultural layers of the Selungur site made it possible to establish a peculiar species composition of the fauna. Most of the discovered remains belong to endemic species of the Central Asian and Central Asian mountain regions. First of all, this refers to the background forms of the Pamir vole Microtus (Neodon) ex gr.Jaldaschi, the eastern mole vole Ellobius ex gr.tancrei, the Libyan (red-tailed) gerbil Meriones libycus selunnguricus, the silvery vole Alticola argentetus, and the Tien Shan forest vole Clethrionomys ex gr.centralis. Pamir (juniper voles Microtus Jaldaschi (Microtus carruthersi).

In the stratified horizons of the Selungur cave site, in addition to communities of small mammals, bone remains of fossil carnivores were discovered, which are of exceptional interest for chronostratigraphic and biogeographic constructions. The species composition of predatory mammals, studied by Baryshnikov G.F. allows you to detail the faunal complex and more accurately determine its biostratigraphic position.

The study showed that the fauna of predatory mammals discovered in the stratified horizons of the Selungur Cave, located on the northern slopes of the Alai Range, included 12 species from 5 families. Here are found archaic forms - Cuon priscus, Canis mosbachensis, Martes vetus, Canis lupus, Panthera leo spelaea, characteristic of the early Pleistocene fauna. Bone remains of Deninger's bear were also discovered. The theriocomplex characterizes the faunal complexes of the Anthropogen of the northern slopes of the Alai Range. The refined species composition of predatory mammals makes it possible to characterize in detail the faunal complex of Selungur and more accurately determine its biostratigraphic position. The stratotype of the Selungur cave is characterized by the following types of mammals (data are given only for carnivores and rodents, as the most detailed groups). Carnivora: Cuon priscus, Vulpes vulpes, Cards mosbachensis, Spelae arctos deningeri, Martes vetus, Hyaena prisca, Panthera cf. P.pardus; Rodentia: Ellobius (Ellobius) ex gr. tancrei, Apodemus sp., Cricetulus migratorius, Meriones (Pallasiomys) libycus selunguricus, Alticola (Alticola) argentatus, Clethrionomys centralis, Microtus (Neodon) ex gr. juldaschi. The fossil fauna of rodents is absent in the early Pleistocene.

Data on large mammals correct this dating. According to the structure of the chewing surface, the molars from Selungur correspond to the teeth of Spelaearctos deningeri. The finding of S. deningeri in the Selungur cave is the first reliable finding of this species in Central Asia.

On the northern slopes of the Alai Range, as the environmental situation changes under the influence of natural and anthropogenic factors, certain changes in the animal world have been noted for 1.5 million years. The Alai theriocomplex discovered in the Selungur cave, according to N.N. Volozheninov, consisted of approximately 31 species. Bats are represented by two species: the Alai bat Myotis alaius and the Alai bat Barbastella alaius. Of the lagomorphs, there are two species - the Alai hare Lepus alaius Volozheninov, Krahmal, 1989, of rodents - 7 taxonomic units. Alai marmot Carmota alaica Volozheninov, Krahmal, 1989, Alai mouse - Apodemus alaius Vo¬lozheninov, Krahmal, 1989, hamster - Cricetulus sp., gerbil - Meriones sp., lure - Rhombomys sp., mole vole - Ellobius sp., vole - Alticola sp.

Thus, in the early periods of the formation of cave deposits, there were ancestral forms of the present-day theriocomplex. In connection with the uplift of the mountain structure, the vertical landscape zonality and the general zoogeographical situation changed. Many species of the animal world developed in parallel with the orogeny. Some representatives of the ancient fauna discovered in the cave deposits of Selungur. isolated by mountain ranges and water barriers, as a result of changing habitat conditions, they disappeared.

The geological age of the Alai faunal complex has been established on the basis of an analysis of the general paleogeographic and biogeographic history of the region. Compared with known and dated complexes. The determinations of the absolute age and the results of paleomagnetic studies were used. The Alai faunistic complex corresponds to the type locality, which occupies a clear geological position on the northern slopes of the Alai Range, framing the Ferghana Intermountain Depression from the south.

Alai faunistic complex is considered as one of the stages of fauna development. The name fauna is used as a term of free use and corresponds to the type locality. In this regard, the results of a comprehensive study of paleozoological material discovered in the stratified deposits of the Selungur cave site are unique material sources in a number of areas of biogeographic research. To prove the synchronism of the stages of development of the mammalian fauna during the last segment of the geological history of the Cenozoic, we have quite reliable data on the absolute chronology of geological events in the zone of the northern slopes of High Asia. The conditions for the formation of the Alai faunistic complex reflect major changes in the physical and geographical situation, against which the formation of the most ancient culture in the history of mankind took place.

The study of the range of the species and population, as one of the important tasks of biogeography, on the territory of the northern slopes of the Alai Range, in the area of the Selungur cave monument, the discovery of rare species of animals that existed during the periods of the early Anthropogen, allowed N.N. Volozheninov to single out a peculiar Alai faunistic complex. Since the discovery of the fossil species S. deningeri, which is dying out as a result of changing environmental conditions, and is not found in the deposits of the Pleistocene epochs, a more detailed dating of this material by the potassium-argon method was carried out.

Analyzes on radionuclides 42K and 40Ar were carried out under the guidance of Academician of the Academy of Sciences of the Republic of Uzbekistan B.S. Yuldashev, Professor Sh. Khotamov, N.S. Osinskaya, T.P. Rakhmonova at the Institute of Nuclear Physics of the Academy of Sciences of the Republic of Uzbekistan. Based on the relevant calculations, the age of the fossil material was determined to be 1.5 million years, which corresponds to the Eopleistocene epoch.

Comprehensive interdisciplinary studies of the history of the early Anthropogenic make it possible not only to reconstruct the natural environment, but also to identify promising areas for further, more in-depth study of the ancient history of mankind in the territory of High Asia.

As a result of further systematic studies of the history of the development of the natural environment, during the Pliocene and Eopleistocene epochs, on the northern slopes of the Kuraminsky Range, bone remains of the southern elephant Mammunthus meridionalis, an extinct species of mammals of the family Elephantidae, were discovered. In sediments with bone remains of a mammoth, stone products of the Early Paleolithic era were found. As a result of the analysis, traces of wear were found on the tools, which made it possible to determine the functional purpose of the most ancient tools. Comprehensive studies of horizons containing mammoth bones and ancient stone tools bring a clear idea of the biology and ecology of mammoths found on the territory of the Chatkal-Kuramin mountain system, framing the Fergana depression from the northwest.

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