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GEOGRAPHIC FACTORS OF TOURISM DEVELOPMENT IN THE SE ALTAI BY THE EXAMPLE OF UNIQUE GEOMORPHOLOGICAL AND ARCHEOLOGICAL SITES IN THE CHUYA VALLEY

Nepop R K [1, 2], Agatova A R [1, 2]
[1] PhD, senior researcher, Ural Federal University, Yekaterinburg, Russia
agatr@mail.ru
[2] PhD, senior researcher, Institute of Geology and Mineralogy SB RAS, Novosibirsk, Russia
rnk@igm.nsc.ru

Abstract. Potential of applying the results of geomorphological and geoarchaeological studies for tourism industry is demonstrated by the example of the Chuya valley between Chuya and Kurai depressions.

Key words: SE Altai, geomorphology, geoarchaeology, tourism

In the recent years, the tourism industry is one of the most dynamically developing sectors of the national economy. It works as a multisectoral complex and is depended on efficiency of cooperation with many public and government services. Natural and geographical specific features, as well as historical and cultural heritage of the region greatly contribute to the development of tourist market. In this context multidisciplinary investigations applying modern scientific techniques give an opportunity not only to solve fundamental scientific and industrial problems, but also to produce unique popular science content. Developing tourism industry can operate as a consumer of such content. This paper demonstrates an example of its creating as a result of geological, geomorphological and geoarchaeological study of the southeastern part of Russian Altai (SE Altai) [1-4]. The Chuya river valley between Chuya and Kurain intermountain depression is a key location where a great variety of landforms, geological subjects and archaeological sites are concentrated. It is also important that the area is situated along the federal road R-256 “Chuya road”. Large amount of obtained data (fig. 1) demonstrates high potential and good perspectives of developing tourism industry in the region.

The SE Altai has a rich geological history and is located on a crossroad of migrations and cultural interconnections between East and West. The region has an extraordinary amount of archaeological monuments, which vary from the Paleolithic time to the Turkic khaganates and Mongol empire. The landscapes of these highlands were affected by vast Pleistocene glaciations, when glaciers extended repeatedly from the high ranges into the major valleys and impounded extensive lakes in the Chuya and Kurai intermountain depressions. Subsequent ice-dam failures led to outburst floods ranked within the largest known terrestrial runoff of fresh water into the Arctic Ocean along the Ob River. Such impressive natural phenomena determined drastic topography changes and landscape evolution for many hundreds of kilometers downstream the main river valleys of the upper Ob basin. Later, the much smaller Holocene hydrological system transformation also influenced the local topography and played an important role for human occupation of the region.

The Chuya valley between the Chuya and Kurai intermountain depressions, examined in this study, is a narrow graben, which separates the Kurai range and Chagan-Uzun massif. The high lacustrine terraces and shorelines, developed on the surface of ancient proluvial cones, are the most prominent evidence of giant Pleistocene ice-dammed lakes, which are preserved in the local topography. Aggregation of boulders and rock fragments (so called “stone gardens”) mark the pathway of high-energy floods, associated with cataclysmic draining of such reservoirs. Specific sediments were produced during these nature events and today their inner structure can be observed in coastal outcrops.

In the central part of graben (fig. 1 K, fig. 2 A) landslide sediments of the multievent Sukor paleodislocation and the terminal moraine complex of the Kuektanar glacier served as a dam on different stages of the Pleistocene landscape evolution. This dam blocked the Chuya river and caused formation of dammed lakes in the Chuya depression. Since the early Holocene after the disintegration of the entire lake in the Chuya basin, the fluvial system remained highly mobile, which is evidenced by the high rate of riverbank retreat and Chuya river channel migration.

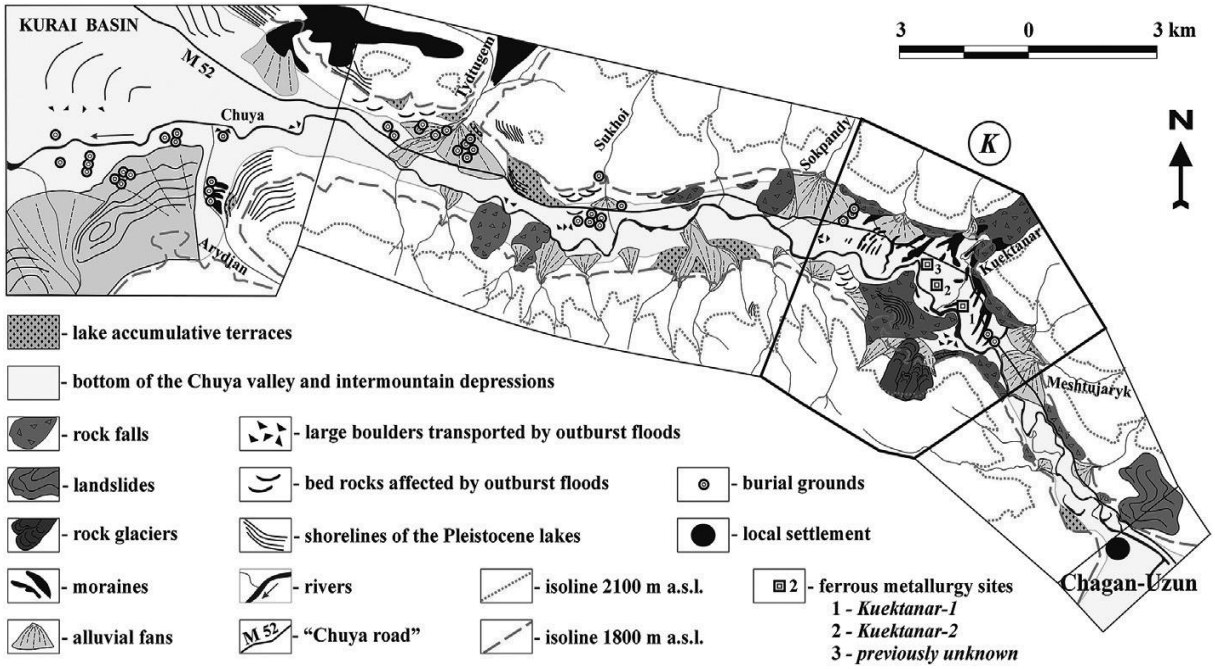

Fig. 1. Geomorphological sketch map of the Chuya valley between the Chuya and Kurai intermountain depressions [2]

The SE Altai is the northern extension of the Mongolian Altai, known for its high seismicity, and is the most seismically active part of the Russian Altai. The Holocene recurrence interval of strong earthquakes in the area is about 800 years and about 400 years for the last 4000 years [3]. The high regional seismicity is also evidenced by the 2003 Chuya earthquake (M_S=7.3), when the southern fault boundary of the Kurai-Chuya system of intermountain depressions was reactivated. The Chagan-Uzun massif is one of the major seismogenerative neotectonic structures in the region. Numerous earthquake-triggered landslides and talus fans are located throughout both Chuya valley slopes within the study area. During the Holocene they repeatedly dammed relatively small lakes. Specific deposits of such lakes are exhumed in natural outcrops and along the bottom of the graben.

Fig. 2. Landforms, geological subjects and archaeological sites within the study area – evidence of unique historical heritage and geological history of the region
A) Moraine and landslide deposits affected by lacustrine activity near the Kuektanar mouth; B) remnants of the iron-smelting Turkic furnaces; C) Turkic burial mounds and balbals

The Chuya valley between the Chuya and Kurai depression is an area where a lot of archaeological sites of various cultures are located. The deflation-exposed Palaeolithic artifacts were described here. There are numerous burial grounds, ritual structures, balbals and stellas associated with the Scythian, Hunnu, and Turkic period, as well as monuments of undefined historical affiliation (fig. 2 C). A set of surface finds associated with

Kyrgys culture of the Middle Ages was also discovered in dune sands upstream of the Kuektanar mouth, as well as three ferrous metallurgy sites [4]. Today almost all of iron-smelting furnaces are rapidly and irrevocably disappearing (fig. 2 B). Together with the other archaeological sites from the nearest proximity within the Chuya and Kurai depressions they suggest a complex Quaternary history of the region but also human adjustment to extreme climatic conditions.

Presented multidisciplinary investigations show the contrasting environmental changes and unique historical heritage of the region, preserved in landforms, sedimentation records and artifacts. Available material can reliably contribute to the development of local tourism industry.

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Information about authors:

Nepop R.K. PhD, senior researcher, Ural Federal University, 620002 Mira str., 19, Yekaterinburg, Russia; Institute of Geology and Mineralogy SB RAS, 630090 Koptyuga av., 3, Novosibirsk, Russia. E-mail: agatr@mail.ru

Agatova A.R. PhD, senior researcher, Ural Federal University, 620002 Mira str., 19, Yekaterinburg, Russia; Institute of Geology and Mineralogy SB RAS, 630090 Koptyuga av., 3, Novosibirsk, Russia. E-mail: rnk@igm.nsc.ru