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Climate changes and human dynamics in the SE Altai (Russia) during the past 4000 years

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This paper focuses on the study of the southeastern part of the Russian Altai (SE Altai) which is the part of the Altai Mountains – the northern segment of the Central Asia collision belt. It represents a combination of landscapes and ecosystems of alpine highlands, vast plateau-topped watersheds and intermountain depressions with unique archeological sites and traditional forms of environmental management of different cultures. The SE Altai has been inhabited since the Palaeolithic but till now the issue of chronology of the archaeological cultures is still debated. From the beginning of the 1st millennium BC, these can be generally regarded as a single economic-cultural type - nomads of arid piedmonts and mountains of temperate zone.

The collective evidence indicates the significantly warmer climate in the SE Altai during the early Holocene. The Neoglacial began here about 5000 years BP and includes three periods of glaciers expansions controlled by climate deterioration (Akkem, Historical and Aktru (LIA) stages). Our numerous radiocarbon dates of fossil soils and wood fragments buried in moraines, glaciofluvial sediments and proglacial forefields argue for prolonged and frequent glacier advances separated by shorter glacier recessions. A decrease in the areas occupied by forest vegetation and the reduction in glacier size at each subsequent glacial stage expressed in the topography suggest aridity intensification during the second half of the Holocene. This conclusion is also supported by the absence of a reaction from the glaciers to the thermal minimum of the middle of 19-th century. It is very likely that such glacier dynamics is a common feature for the whole Central Asia.

Thus the evolution of Altai nomad cultures, discussed in this paper, corresponds to a period of cooling and aridity intensification. In spite of climate deterioration that was the time of prosperity of the Altai nomadic cultures. It is most richly characterized by numerical dates of archaeological finds and major nature events which control migrations and shifting of Scythian, Hunnu, Turk and later nomadic cultures in the region. We present here an expanded dataset of new radiocarbon dates of fossil soils and charcoals from iron-smelting furnaces, dendrochronologically obtained ages of tree fragments washed up from glaciers in a modern glacial zone as well as lifespan analysis of archeological burial grounds and their spatial distribution within the Kurai and Chuya depressions. All these allowed us to correlate major nature events with the human dynamics in the SE Altai during the second half of the Holocene.

Climate together with political and social aspects is one of the major factors that controlled the size of population, evolution and migration of nomadic cultures in the region. The influence of climatic changes on human societies was much stronger than the opposite. Anthropogenic impact is restricted to massive timber cutting which contributed to deforestation of the eastern part of the SE Altai.

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