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CONTROL ID: 1798793

TITLE: Reconstruction of the late Holocene climate in the Minusink Hollow, south-central Siberia, and its potential influence on settled farming versus nomadic cattle herding

ABSTRACT BODY: Introduction. Prehistoric and early historic human cultures are known to be closely connected to and dependent on their natural environments. Gumilev (2000) developed a theory relating the rise, development and fall of human cultures (ethnos) to the changing environment. This theory improved our understanding of human history as the natural interactions the biosphere and sociosphere.

We test the hypothesis that climate change altered the means of subsistence of ancient tribes and forced them to choose agricultural or cattle herding economic strategies. Our study area is the Khakass-Minusinsk Hollow located at the foothills of the Sayan Mountains, south-central Siberia, which was, for a few millennia, a buffer zone for human migrations across the Great Eurasian Steppe.

Methods. Three different methods (the Montane Bioclimatic Model; the biomization method; and the actualism method) were employed to reconstruct vegetation from the fossil pollen of sediment cores of two mountain lakes in the study area at eleven time slices relating to successive human cultures back to the midHolocene. Our bioclimatic model was used inversely to convert site paleovegetation into site paleoclimates. Climate-based regression models were developed and applied to reconstructed climates to evaluate possible pasture and grain crops for these time slices.

Results. Our pollen-based reconstructions of the climate fluctuations uncovered several dry periods with steppe and forest-steppe lands dominating up to 85% of the area and four wetter periods with forests dominating up to 60% of the area since 6000 BP. Grasslands increased one order of magnitude during the dry periods and provided extensive open space likely suitable for pastoralism; however, both grain and pasture yields dropped during these dry periods. During wetter climates, both grain and pasture yields could increase twofold and support more fixed human settlements centered around farming and herding cattle. Thus, the dry periods favored pastoralist rather than farming activities. On the other hand, tribes that practiced agriculture got some advantage in wet periods.

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