



## **Middle-Late Holocene environmental history of Kulunda (Southwestern Siberia): vegetation, climate, humans**

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Environmental reconstruction of Mid-Late Holocene vegetation and climate was inferred from pollen records of Lake Big Yarovoe (Kulunda steppe, Southwestern Siberia). Reconstruction suggests generally prevalence of steppe during last 4.45 ka. Relatively warm and dry climate, open semi-desert and dry steppes with patchy birch forest spread between 4.45 and 3.80 ka BP. The largest development of conifers forest started in Kulunda after 3.80 ka BP. Constant presence of dark-coniferous trees *Abies* and especially *Picea* between 3.80 and 2.7 ka BP indicates the most humid period in the region during studied time. Onset of the Late Holocene is characterised by dominance of steppe with birch and pine forests in lowlands and river valleys. After AD 1860, open steppe and semi-desert vegetation with fragmentary birch forest have been dominated parallel to sharp reduction of conifers in Kulunda. These results are in agreement with general scheme of Holocene environmental history of surrounding areas including Baraba forest-steppe, Kazakh Upland and Altai Mountains.

Territory of Kulunda consists many archaeological sites of Bronze, Iron and Middle Ages. Second half of Bronze Age (4.45-3.80 ka BP) was represented by local human cultures or migrants from the North Kazakhstan. The main archaeological culture of Kulunda alike in the whole Ob'-Irtys' interfluvium in this period was Elunino culture. The economical activities of Elunino community were connected with animal breeding especially with sheep and goats. The most humid period (~1795-710 BC; 3.8-2.7 ka BP) in Kulunda corresponded to the end of early Bronze Age and to the onset of the Iron Age. In 18 century BC Andronovo culture, associated with the Indo-Iranians and migrants from Central Kazakhstan, spread in the region. Cattle breeding economy was distinctive features of Andronovo people, however, increase of sheep, goats and horses with transition to nomadic life style was characteristic of the late Bronze Age. This trend is in good agreement with increase of humidity and development of snow cover in winter. Horses and small animals like sheep and goats can forage from under the snow. New economical type was finally established in the early Iron Age and remained until occupation of the region by Russian migrants (onset of 19 century). Afforestation of Kulunda started in the beginning of the Middle Ages and coincided with great migration of population. During the second half of the first AD millennium, the First and Second Turkic Khaganates were established in Kulunda. From the beginning of AD 13 century Altai was under the Mongolian influence. There are no archaeological and literary evidences from Kulunda between AD 15-16 centuries. Probably, environmental conditions of Little Ice Age caused migration of population southwards. Mongolian nomads inhabited the territory of Kulunda in the AD 17-18 centuries; in the middle of AD 18 century Kulunda was settled by Russian. The most significant population of the Russian peasants started to settle here only in second half of AD 19 century. Pollen data recorded in Lake Big Yarovoe core indicated that right from this time forests started to decrease and open steppe spread in Kulunda.