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## The origin of objects of invertebrate descent from the Khvalynsk Eneolithic cemeteries (Northern Caspian region)

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### ABSTRACT

The summary of the study of invertebrates used for decorative items from Khvalynsk Eneolithic Cemeteries is presented. AMS radiocarbon dating confirmed that freshwater *Unio* mother-of-pearl shells and nacre discs, manufactured from them, are coeval with the site and most likely local in origin. Tubes of the sea worms and marine shells are fossil and some may originate from local deposits. Other are probably related to the ancient Paratethys basin sediments and can have diverse origin spanning from Caucasus and Caspian shores to Carpathian and Mediterranean area. *Glycymeris* L. clams are most likely originated in the latter area. The discussion of the obtained AMS <sup>14</sup>C results agrees with a possibility of a noticeable ingress of younger carbon, irremovable by standard methods and affecting the determinations, probably related to a bacterial activity in deposits.

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### 1. Introduction and regional setting

The Copper Age burial grounds known as Khvalynsk Eneolithic Cemeteries (KEC), are located in the Khvalynsk district of the Saratov region on the right bank of the Volga River (Fig. 1), occupying an area of over 1000 m<sup>2</sup>. Individual, multi-tiered and single-tiered burials (about 160 skeletons) were discovered and excavated in 1977–1979 (further down marked as KEC-I – first stage excavation) and in 1987–1988 (KEC-II – second stage excavation) (Agapov et al., 1990; Pestrikova and Agapov, 2010). Most buried men, women and children were lying in a supine position; in some rare cases the posture of the deceased was a flexed position on the right or the left side. Grave offerings included ochre, clothes decoration, ceramics, stone tools, metal objects. High-status burials contained scepters, axes and head bands with copper rings.

KEC are situated at an ideal habitat for various birds and

mammals: the wide Volga River floodplain with numerous channels, islands and lakes; forests; high and steep river banks; steppe areas. The large number of items and decorations from animal bones and teeth of different taxa was excavated. Vertebrates (birds and mammals) are represented by species still living in the area: Swan (*Cygnus* sp.), large predatory bird from Accipitridae family, White-tailed eagle (*Haliaeetus albicilla* L., 1758), Great bustard (*Otis tarda* L., 1758), also Beaver (*Castor fiber* L., 1758), Elk (*Alces* L., 1758), Red deer (*Cervus elaphus* L., 1758) and Wild boar (*Sus scrofa ferus* L., 1758). Besides the mentioned species, the cattle skeletal elements and “rings” from the tubular bones of a middle sizes ungulates (Kirillova, 2010) were also present. Multidisciplinary investigation of obtained materials together with anthropological and zooarchaeological studies of KEC allowed researchers to define the specific Khvalynsk pastoralist culture of the Volga basin area. It was formed on the base of Samara culture and occupied wide area – from Middle Volga in the north down to the Sea of Azov in the south-west, and Ural River in the south-east. Culturally it was close to the Sredny Stog Eneolithic culture, so that even one of the hypothesized origins of Khvalynsk culture was a suggested migration of Sredny Stog population eastward because of progressive aridization (Klein, 2007).

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Fig. 1. Location of the Khvalynsk Eneolithic cemeteries.

The isotope composition of collagen of bones of the deceased buried in the Khvalynsk burial ground demonstrates that river fish was an important component on their diet system (Shishlina et al., 2009). The assemblage of the grave offerings (scrapers, knives, perforators) indicates that people treated hides and skins and made such items as embroidered cloths ornamented with shell and bone beads. Artifacts indicating rank such as copper rings, ocher, stone scepters were, probably, acquired through trade exchange (Agapov et al., 1990; Pestrikova and Agapov, 2010).

A series of  $^{14}\text{C}$  dates of the samples from the Khvalynsk burial ground produced an age range of 5500–4500 cal BC (Agapov et al., 1990; Chernykh et al., 2000). Calibrated radiocarbon dates and chronology of the Khvalynsk burial ground was based on human and animal bones and shells. However,  $^{14}\text{C}$  dates of human bones obtained for cultures whose representatives consumed significant share of aquatic food can be older due to the reservoir effect (Lanting and van der Plicht, 1998; van der Plicht et al., 2016).

Paired  $^{14}\text{C}$  dating of human, sheep, and cow bones from the Eneolithic Khvalynsk graves was used in order to quantify the size

of the reservoir effect. The analyzed human bone from KEC-II grave 10 is  $220 \pm 95$  years older than a cow bone from the same grave. The date of a ring made of an ungulate bone from KEC-I, grave 147, is the same as for the cow bone. For this grave, the reservoir effect appears to be about  $275 \pm 60$  years (Shishlina et al., 2009).

This indicates that the chronology of Khvalynsk burials may be actually younger, possibly in the range of 4900–4200 cal yrs BC.

A great number of decorations made from invertebrate material, dominantly from various mollusc shells were discovered (Figs. 2 and 3). Especially numerous were rows of disk shaped beads, made of the freshwater Unionidae shells. Nacre beads were found to appear older than bone items (Chernykh et al., 2000). Their apparent radiocarbon age was in the range of 6500–7100 years, which corresponds to approximately 6400–5200 cal BC. The reason for this most probably is the local reservoir effect, which is discussed later.

Decorations made from marine organisms on the other hand were rare and represented commonly by rows of Scaphopoda and *Glycymeris* shells and fragments of calcareous tubes produced by

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