Archaeological Research in Asia 26 (2021) 100224

Contents lists available at ScienceDirect

Archaeological Research in Asia

journal homepage: www.elsevier.com/locate/ara

Full length article

Middle Holocene hunter-gatherer mortuary practices in the Little Sea microregion on Lake Baikal, part I: Early Neolithic

O.I. Goriunova [a], A.G. Novikov [a], G.V. Turkin [b], A.W. Weber [a,c,d,*]

[a] Research Centre "Baikal Region", Irkutsk State University, Karl Marx Street 1, Irkutsk 664003, Russia
[b] Altamira Ltd., Angarsk, Russia
[c] Department of Anthropology, 13-15 H.M. Tory Building, University of Alberta, Edmonton, Alberta T6G 2H4, Canada
[d] Laboratoire Méditerranéen de Préhistoire Europe Afrique (LAMPEA) – UMR 7269, Aix-Marseille Université, 5 rue du Château de l'Horloge - B.P. 647, 13094 Aix-en-Provence Cedex 2, France

ARTICLE INFO

Keywords:
Cis-Baikal
Little Sea
Lake Baikal
Cemeteries
Early Neolithic
Mortuary practices
Radiocarbon dating

ABSTRACT

Archaeological research on Cis-Baikal Early Neolithic mortuary practices has traditionally focused on the Kitoi mortuary tradition with its rich materials known from several large cemeteries of the Angara Valley and Southwest Baikal. Assemblages that do not fit that description have attracted much less attention. Currently, in Cis-Baikal, the Little Sea microregion has the highest number of such graves. The mortuary variation displayed by this material (31 burials from 26 graves at 8 localities) allows their provisional classification into two mortuary groups: the Khotoruk Group, which shows a few similarities with the Kitoi pattern, and the Kurma Group, which does not. Both groups also share a few characteristics, primarily their "Mesolithic" character of many grave inclusions. Not a single grave of the Khotoruk Group displays a complete package of classic Kitoi mortuary pattern, giving an overall impression of being its much impoverished and limited version. It seems that while on the Angara and Southwest Baikal the Kitoi cultural pattern was going through a period of rather dynamic cultural developments, the Little Sea microregion was not much affected by these processes. The evidence suggests a fusion of a few typical Kitoi mortuary characteristics with those of local origin. Based on the set of 15 radiocarbon dates, both groups coexisted roughly at the same time and together date from 8154±153 to 7277±103 modelled cal. BP. As such, the origin of the Khotoruk and Kurma Groups appears to predate the formation of the Kitoi cultural pattern by a few centuries and their end seems to be also earlier than that of the Kitoi.

1. Introduction

This is the first in a series of two papers dedicated to the examination of Neolithic mortuary variation within the Little Sea microregion of Cis-Baikal, Eastern Siberia. The second study, appearing also in this special issue, reviews the Late Neolithic (LN) mortuary material (Goriunova et al., 2020), whereas the goal of this paper is to summarize the available archaeological material referred to as the Khotoruk and Kurma mortuary groups of the Little Sea area. The currently documented Early Neolithic (EN) mortuary assemblages in the Cis-Baikal region of Eastern Siberia can be sorted into two main types (Bazaliiskii, 2010, 2012; Weber et al., 2021; Weber, 2020). The first is the Kitoi mortuary tradition, known from the upper section of the Angara valley (e.g., the Lokomotiv, Kitoi, and Ust'-Belaia cemeteries) and the coast of Southwest Baikal (the Shamanka II cemetery). The second type comprises graves that show some similarities with the Kitoi (mainly the presence of red ochre) but otherwise display substantial differences. Among this second type of graves Bazaliiskii defines four geographic groups: Upper Lena South (e.g., the Makrushino and Iushino cemeteries), Upper Lena North (e.g., the Turuka cemetery), Little Sea, and East Baikal (represented mainly by the Fofanovo cemetery in the Selenga River delta in Trans-Baikal), each of which shows a number of local idiosyncrasies. Field and laboratory research conducted over the last 10–20 years in the Little Sea microregion, including radiocarbon dating of the associated human skeletal remains, substantially expanded the available empirical data for this area, making a new assessment important not only for the microregion but also for Cis-Baikal more broadly. Consequently, the goal of this study is to summarize all currently available data on EN graves from the Little Sea microregion, to identify the main characteristics defining the EN mortuary protocol there, to establish its chronology, and to place this

* Corresponding author at: Research Centre "Baikal Region", Irkutsk State University, Karl Marx Street 1, Irkutsk 664003, Russia.
E-mail address: aweber@ualberta.ca (A.W. Weber).

https://doi.org/10.1016/j.ara.2020.100224
Received 8 July 2020; Received in revised form 24 July 2020; Accepted 19 August 2020
Available online 19 March 2021

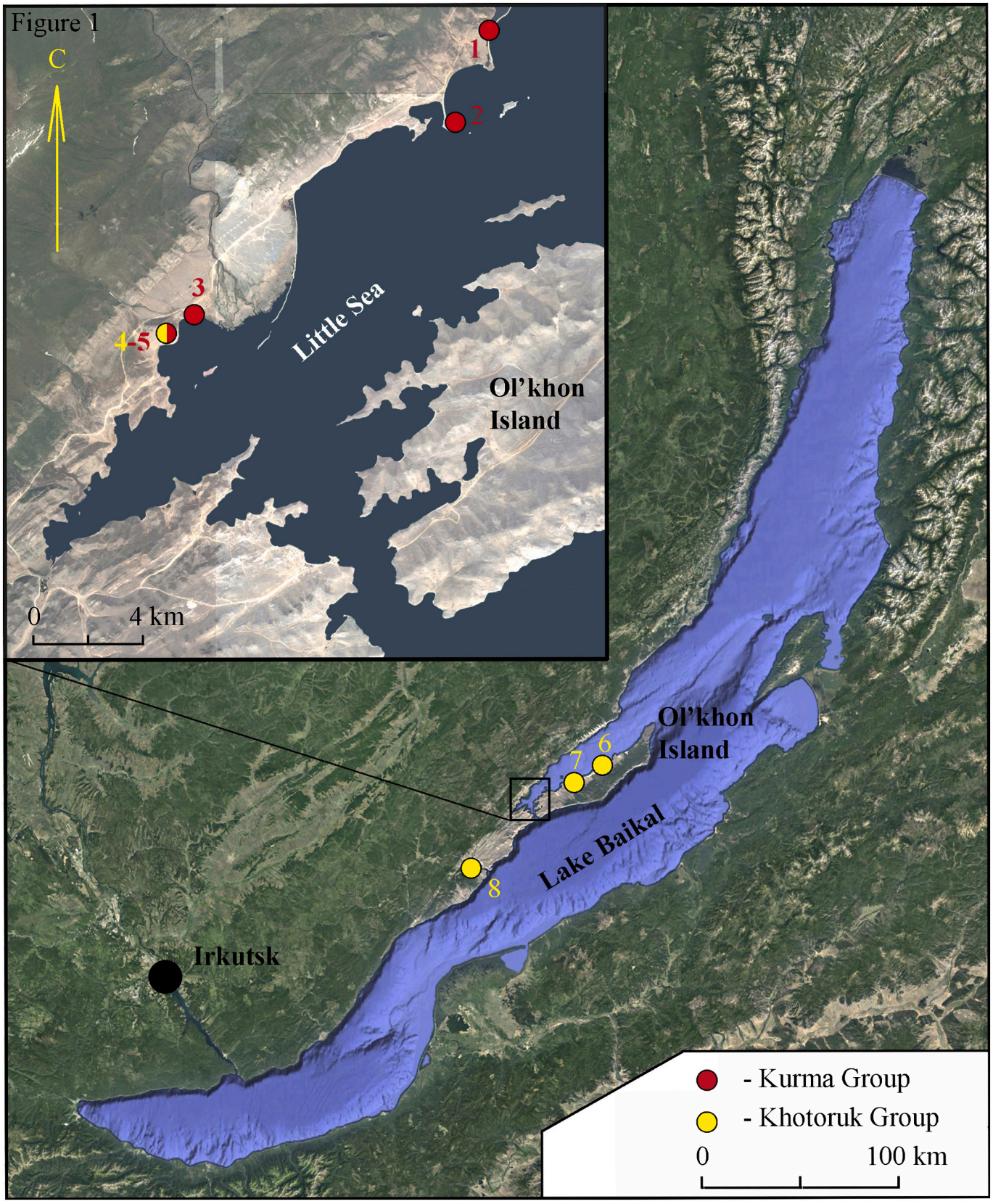

Fig. 1. Location of Early Neolithic cemeteries within the Little Sea micro-region, Cis-Baikal, Siberia: 1–Kurma XI; 2–Mys Uiuga; 3–Sarminskii Mys; 4–Khuzhir-Nuge IX; 5–Khuzhir-Nuge XIV; 6–Shamanskii Mys I; 7–Khonkhoiskaia Guba I; 8–Khotoruk II.

material within a broader regional archaeological context.

The Little Sea microregion encompasses the west coast of Lake Baikal from the Elokhin Mys (cape) in the north (roughly across from the northern tip of Ol'khon Island) to the mouth of the Bugul'deika River in the south (about 75 km SW along the coast from the southern tip of the same island) and Ol'khon Island itself (Fig. 1). Information about past and modern environmental and climatic conditions characterizing Cis-Baikal and the Little Sea microregion, can be found in a few summaries recently published in English (e.g., Tarasov et al., 2017; Weber et al., 2002; Weber and Bettinger, 2010; Weber, 2003) and also in two papers included in this special issue (Kobe et al., 2020; Weber, 2020).

Although today the microregion features one of the best archaeological records within the entire Cis-Baikal region, systematic research into Middle Holocene mortuary practices of the Little Sea area started relatively late. In association with the forthcoming damming of the Angara River in Irkutsk, the USSR Academy of Sciences launched a large fieldwork campaign in the late 1950s to survey the coast of Lake Baikal and to excavate archaeological sites considered to be in danger of being destroyed by the waters of the lake, which were expected to rise by about 1 m. This early research, as well as subsequent work (until about the late 1990s), was conducted within the framework of the culture history model developed for Cis-Baikal by A.P. Okladnikov (1950). The model supposed a continuous evolution of the region's mortuary traditions as follows: Khin—Isakovo—Serovo—Kitoi—Glazkovo, in which the first dated to the Mesolithic, the next three to the Neolithic, and the last one to the Early Bronze Age (EBA).

The model was developed based on materials almost exclusively from the Angara valley gathered before World War II. All new mortuary materials produced by subsequent archaeological fieldwork were expected to fit into the Okladnikov model and were classified as one of his five mortuary traditions. In many instances, however, the new materials, including those from the Little Sea area, displayed dimensions of mortuary variability that were previously unknown. Consequently, many of the new mortuary assemblages appeared not to fit into the Okladnikov model as neatly as anticipated and so were classified generically as Neolithic rather than more specifically as Isakovo, Serovo or Kitoi (e.g., Goriunova and Khlobystin, 1992; Komarova and Sher, 1991; Konopatskii, 1982).

The first radiocarbon dates for the Neolithic and Early Bronze Age graves from the Little Sea microregion questioned the chronological position of the Kitoi mortuary tradition in the Okladnikov sequence. The dates indicated that Kitoi was much older, unexpectedly predating the Isakovo and Serovo groups (Konopatskii, 1982). Continuation of the radiocarbon dating program in Russia (Mamonova and Sulerzhitskii, 1989) and its substantial expansion by the Baikal Archaeology Project confirmed a significantly different sequence for these mortuary groups: Khin—Kitoi—discontinuity—Isakovo & Serovo—Glazkovo (Weber et al., 2006, 2016, 2021). In the new sequence, not only does the Kitoi group predate the Isakovo and Serovo groups (which appear to be contemporaneous; Mamonova and Sulerzhitskii, 1989; Weber et al., 2021; Bronk Ramsey et al., 2021), but Kitoi is separated from Isakovo & Serovo by at least several centuries during which the local hunter-gatherers did not use formal cemeteries to bury their dead (Table 1). The new chronology of Cis-Baikal Middle Holocene mortuary traditions was accepted gradually, and most of the Russian literature published prior to the 2000s still referenced the original Okladnikov model.

Two effects of the new radiocarbon chronology are most relevant for this study. First, it quickly became clear that the Kitoi mortuary tradition in its classic form, while defining the EN period, was spatially restricted to the Angara valley and Southwest Baikal. Elsewhere in Cis-Baikal, graves of a similar age were quite different in terms of mortuary characteristics, showing at most a few Kitoi traits (e.g., red ochre, shanks of composite fishhooks or arrowheads with concave asymmetrical bases) with local idiosyncrasies clearly prevailing. Second, the radiocarbon dates shifted the chronological position assigned to many graves: some were much older, others younger. Particularly affected were graves initially classified generically as Neolithic because they did not fit well with any of Okladnikov's Neolithic mortuary groups, or as "Kitoi?" because they had red ochre in them but otherwise differed significantly from the Kitoi pattern. While the following historical sketch of relevant archaeological fieldwork in the Little Sea area adopts changes in the chronological classification prompted by radiocarbon dating, it must be kept in mind that in some cases graves not yet dated may still be reclassified.

Table 1
Summary of current culture history and its chronological boundaries for the Middle Holocene Cis-Baikal region (after Weber et al., 2021).

Period	Mortuary traditions	HPD Cal. BP[a]
Late Mesolithic	Khin & other	*8630–7560*
Early Neolithic	Kitoi & other	*7560–6660*
Middle Neolithic	Lack of formal cemeteries	*6660–6050*
Late Neolithic	Isakovo, Serovo	*6050–4970*
Early Bronze Age	Glazkovo	*4970–3470*

[a] HPD = Modelled highest posterior distribution.

2. Archaeological fieldwork in the Little Sea Microregion

The first Neolithic graves in the Little Sea were located and excavated in 1959 by the Irkutsk Archaeological Expedition (Leningrad Branch of the Institute of Archaeology, USSR Academy of Sciences), under the direction of M.P. Griaznov (Griaznov and Maksimenkov, 1992). In all, seven Neolithic graves were excavated, two of which (Graves 12 and 15 at Ulan-Khada IV) were classified as representing the Kitoi mortuary tradition (Komarova and Sher, 1991: 39; Goriunova and Khlobystin, 1992: 52–3). Since recent radiocarbon dating of the surviving human skeletal remains from Grave 12 suggests a Late Neolithic (LN), rather than EN, age (Weber et al., 2021), and the typological grounds for associating Grave 15 with the Kitoi mortuary tradition are very weak, both graves have been excluded from the current examination. Additionally, although the radiocarbon date for Grave 5 from Ulan-Khada II suggests its EN age (Weber et al., 2021; White et al., 2020a, 2020b), the grave is not included in this study due to the minimal archaeological information available for it.

The work conducted during the 1970s at Shamanskii Mys on Ol'khon Island by the North-Asiatic Archaeological Expedition of the Institute of History, Philology, and Philosophy (Siberian Branch, USSR Academy of Sciences, Novosibirsk), and directed by A.P. Okladnikov, revealed one more grave (Grave 3–1972) classified as Kitoi (Fig. 1; Konopatskii, 1982; Aseev, 2003). It was the radiocarbon dates obtained for this grave, the first ever for a grave showing Kitoi characteristics, which suggested that the Kitoi mortuary tradition predated the Isakovo and Serovo groups and was much older than indicated by the Okladnikov model (Konopatskii, 1982). The Sayan Team of the same Expedition discovered a cemetery at Khotoruk II, near the mouth of the Anga River on the coast of Baikal, roughly 35 km southwest from Ol'khon (Fig. 1). Between 1977 and 1979, seven graves were excavated at this cemetery, all of which were classified as Kitoi (Konopatskii, 1982; Aseev, 2003: 70–74).

Additional discoveries of such materials occurred throughout the new millennium. First, in 2003, the Russian–Canadian Archaeological Expedition, led by O.I. Goriunova (Irkutsk State University) and A.W. Weber (University of Alberta), excavated a group of six graves at the Kurma XI cemetery (Fig. 1). Based on a few typological criteria and radiocarbon dating, these graves were assigned to the EN (Goriunova and Weber, 2003; Weber and Goriunova, 2005; Goriunova et al., 2012: 141–2; Weber et al., 2012). Since the material from Kurma XI displayed several locally unique mortuary characteristics (e.g., presence of surface stone structures, lack of red ochre, etc.), they were designated as a new local mortuary group under the name of "Kurma", distinct from the classic Kitoi (Goriunova et al., 2012: 141–142; Novikov and Goriunova, 2012).

Next, fieldwork conducted in 2004, 2006, and 2013 by G.V. Turkin on Ol'khon Island further expanded the number of EN mortuary assemblages with six new graves excavated at the Khonkhoiskaia Guba I cemetery (Fig. 1). In 2010, a team from the Laboratory of Ancient Technologies (Irkutsk State Technological University), led by A.V. Kharinskii and A.V. Lun'kov, excavated the Khuzhir-Nuge IX cemetery (Fig. 1). One of the graves (No. 3) displayed a number of mortuary characteristics, including grave goods, consistent with those collected from the other EN graves in Little Sea area (Kharinskii and Lun'kov, 2010: 27–31). Lastly, one more EN grave was excavated in 2013 by a group of students under the supervision of D.E. Kichigin (Irkutsk State Technological University) at Mys Uiuga, near the Kurma village (Fig. 1; Kichigin, 2014; Kichigin et al., 2017). The EN chronology of this grave is supported by the typology of a ceramic vessel found within as well as by the radiocarbon date. Fieldwork at this site continues.

Since the late 1990s, the Russian–Canadian Baikal Archaeology Project (lead by A.W. Weber and O.I. Goriunova) has implemented a large program of radiocarbon dating Middle Holocene (from Late

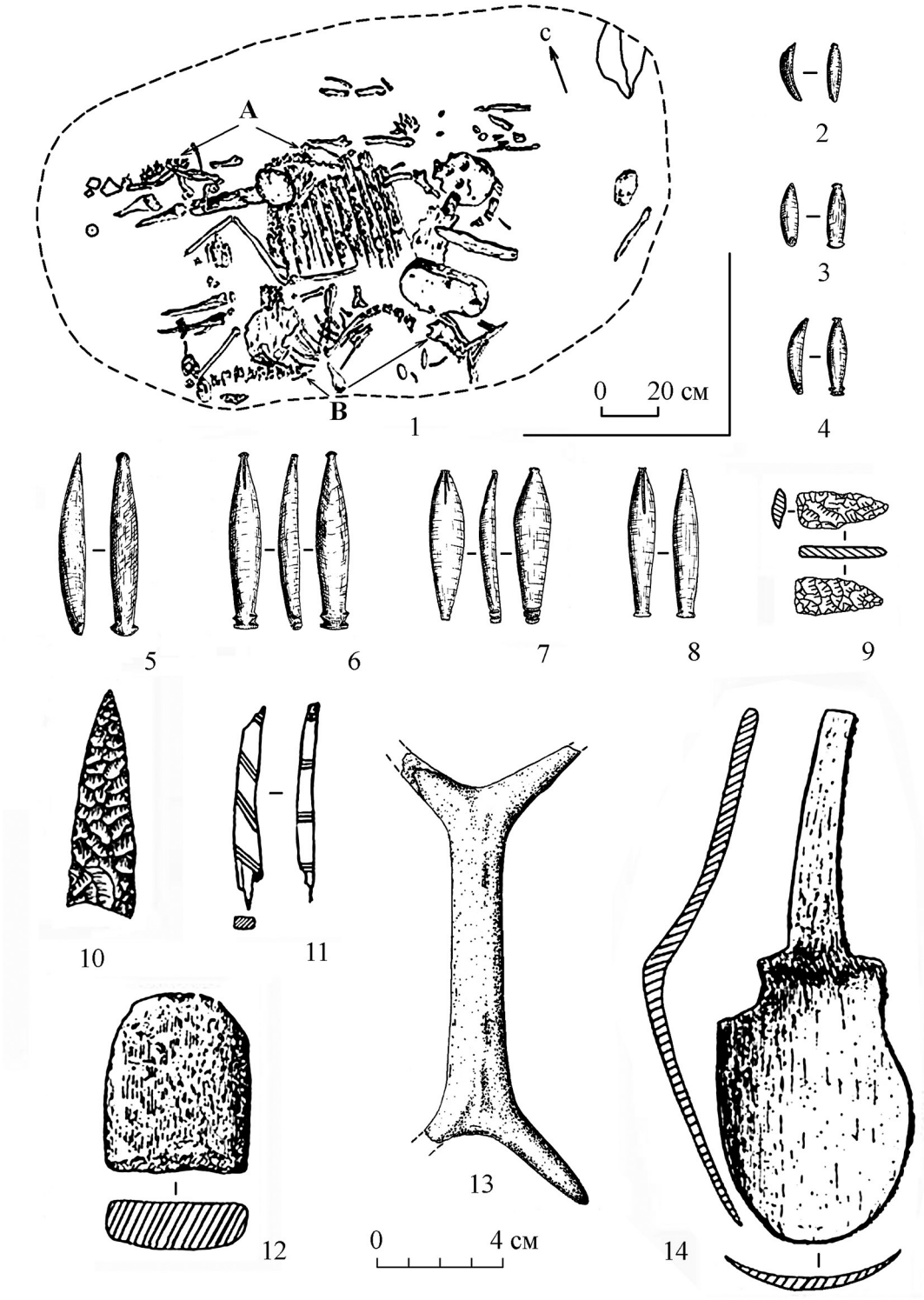

Fig. 2. Shamanskii Mys I: 1–Grave 3–1972; 2–14 grave goods (after Konopatskii, 1982).

Mesolithic to Bronze Age) burials from Cis-Baikal, including materials from the Little Sea microregion. This resulted in several graves with inconclusive typological diagnostics being assigned to the EN. For example, three graves from the Sarminskii Mys cemetery (excavated by O.I. Goriunova in 1986 and 1987) and labeled previously as LN Serovo received EN radiocarbon dates (Graves 22, 24, and 34; Weber et al., 2016; Weber et al., 2021). These three graves stand out from the rest in terms of spatial location within the cemetery as well as the lack of sheets of birch bark covering the burials and the absence of fires inside the graves. These two mortuary characteristics are common in LN graves at Sarminskii Mys and have been considered as defining the Serovo mortuary tradition in the Little Sea microregion (Goriunova, 1997: 27–30, 32–36; Goriunova et al., 2020). The new radiocarbon date for Grave 7 from Khuzhir-Nuge XIV, excavated by O.I. Goriunova and A.W. Weber in 1997, also suggests an EN chronology rather than LN, as originally thought (Novikov and Goriunova, 2012; Weber et al., 2006, 2008, 2021. These four graves are now included in this analysis.

In sum, since the late 1950s, archaeological research in the Little Sea microregion has revealed 8 localities accounting for a total of 26 graves and 31 burials (Fig. 1, Tables 2 and 3) which, based on a combination of typological and radiocarbon criteria, are considered to belong to the EN. This material has the potential to reveal new insights about mortuary practices of the hunter-gatherers inhabiting this microregion while the relatively large number of radiocarbon dates available now for these burials allows a new approach to chronological analysis and improved understanding of the temporal aspects of these practices.

2.1. Materials

This section briefly reviews the materials analyzed in the paper. The following account is based on published monographs and research papers, as well as archival fieldwork reports.

2.1.1. Shamanskii Mys I

Only Grave 3 (excavated in 1972) dates to the EN, all others date to either the LN or EBA. Grave 3–1972 was located close to the narrow part of the landform connecting the Shamanskii Mys with the rest of Ol'khon Island, roughly 24–26 m above the lake level. The burial was found under a stone structure, which first appeared roughly 0.40 m below the modern surface. The paving measured 2.2 × 1.3 m and its long axis was oriented NWW–SEE. Underneath the stone structure, about 0.85 m from the modern surface, there was a ceramic vessel with net-impressions on the surface and a round-bottom. A row of relatively large pits decorated the rim. Some animal bones and a few pebble-flakers were found next to the vessel. The stones of the paving were stained by red ochre. Below the stones, there was a layer of birch bark, showing marks of stitching, supported by wooden stakes. Two dog skeletons, both laying on their right side with the heads pointing east, were found on top of the birch bark layer (Fig. 2: 1A–B). Next to the dogs, there was a container made of birch bark with red ochre, bone and stone implements, and longitudinally split animal long bones. The bone implements consisted of 1 bone/antler shaft of a composite tool, 2 pressure flakers, 1 spoon or spatula with flat bowl (Fig. 2: 14), 1 reel for fishing line (Fig. 2: 13), and 1 split boar tusk. Stone implements comprised of 1 quartzite knife, 1 scraper, 1 end-scraper, and 1 flake (Table 3).

The human burial was located below the layer of birch bark. It was laid out in supine position with legs flexed towards the chest and the head pointing east. The interment, fully covered by red ochre, was resting on another layer of birch bark lining the pit floor (Table 2). Grave goods directly associated with the burial consisted of tube beads and red deer canine pendants, fragments of 3 bone harpoons, 2 antler points, 1 fragment of a decorated bone blade, probably a bow stiffener (Fig. 2: 11), 3 bone polishers, 4 abraders (Fig. 2: 12), 2 arrowheads with asymmetrical concave base (Fig. 2: 10), 1 biface for a composite tool (Fig. 2: 9), 2 prismatic blades, 2 pieces of slate with sawing marks, 10 bone/antler hooks for composite fishhooks, and 17 shanks for composite fishhooks: 1 of the Baikal type (with lateral hook attachment) and 16 of the Kitoi type (with frontal hook attachment). Some of the hooks were made of bird or mammal claws.

Excluding the dog skeletons, other animal bones, tube beads and the red deer canine pendants,[1] but including the ceramic vessel and the artifacts found in association with the dogs, the total count of grave goods was 59 items (Table 3).

2.1.2. Khotoruk II

The cemetery was located on the west edge of a small depression on the right bank of the Anga River, about 3 km from its mouth at Lake Baikal (Fig. 3). Seven graves were discovered on the south-facing slope about 20–30 m above the river. All graves featured compact, oval-shaped surface stone arrangements about 2.5–4.5 × 1.8–3.0 m in size. Generally, the stone structures were oriented N–S. Five graves (Nos. 1–2, 4, 5, 7) also had stones inside the pits. The depth of the graves varied between 1.15 and 1.20 m from the modern surface. Three graves (Nos. 1, 6, and 7) contained single burials, three (Nos. 3, 4, and 5) had double burials, and one grave (No. 2) had three interments. The two burials in Grave 3 were arranged on two separate levels while the burials in the other graves with multiple interments were arranged on the same level. Body positions were quite variable: five burials were supine with flexed legs (Fig. 4: 4) and five were flexed on their right side. The body position of burials in the graves with multiple interments also varied. In Grave 2, the dead were laid out either supine with flexed legs or on their side with flexed legs (Fig. 4: 5). In Grave 5, one interment was on its side with flexed legs, the other was a secondary burial consisting of a pile of bones placed on the legs of the first individual (Fig. 4: 2). Most interments were oriented with their heads pointing generally north but in Grave 2 one of the three burials was placed head-to-toe with the others, its head pointing south.

Red ochre was documented in all graves. Entire skeletons stained by red ochre were observed in four graves (Nos. 2, 4, 5 and 6) while partial staining was found in the remaining three graves (Nos. 1, 3, and 7) affecting the skull in three cases and the pelvic area in one instance (Table 2). The grave goods were few: 1 end-scraper (Gr. 1), 1 adze with lugs (Gr. 5, Fig. 4: 6), 1 bone shaft of a composite implement and 1 two-sided symmetrical bone/antler harpoon with a perforation at the base (Gr. 3, Fig. 4: 3); red deer canine pendants (Gr. 2 and 4), 1 pendant on a split boar tusk (Gr. 4), and fragments of animal long bones (probably deer; Gr. 3 and 4). Two graves had no artifacts at all (Gr. 6 and 7; Table 3).

2.1.3. Khonkhoiskaia Guba I

The cemetery was located on the south-facing slope of the Elgai Mys next to Khonkhoi Lake on Ol'khon Island (Fig. 5). Thus far, 6 EN graves (Nos. 2–7) have been found around 20–23 m above Lake Baikal. While only Grave 6 had an oval layer of surface stones (2.5 × 3.0 m), located 0.3–0.5 m below the modern surface, most grave-pits contained flat slabs forming compact arrangements measuring about 0.65 × 1.8 m (Fig. 6:1). Grave 7, completely lacking in stones, was the exception. Grave-pits appeared 0.6–1.0 m below the modern surface. Most graves had single interments (Gr. 2, 4, 6, and 7), while two contained double burials (Gr. 3 and 5) placed on the same level. Five individuals from four graves, including the ones with double burials, were interred on their right side with legs tightly flexed, making this the most common body position at Khonkhoiskaia Guba I (Fig. 6: 3). One burial was interred supine with knees splayed out and flexed (Gr. 6, Fig. 6: 2), and one other on its right side with legs slightly flexed (Gr. 7). With minor variations, the heads were pointing north. In one of the graves with double interments, they were arranged toe-to-toe: in one line in the same pit with

[1] Beads and red deer canine pendants are excluded from the counts of grave goods because their numbers have been reported inconsistently. In some cases, only their presence is mentioned.

Fig. 3. General view of the Khotoruk II cemetery photographed from the south.

heads away from one another—one pointing north and the other south—and the feet touching one another (Gr. 5, Fig. 6: 3). In Cis-Baikal, such toe-to-toe placement is without analogues within the entire large number of Neolithic and EBA burials. In the other grave with two burials (Gr. 3), they were probably arranged head-to-toe.

Copious amounts of red ochre were found in four graves (Nos. 3–5, and 7) while two graves (Gr. 2 and 6) had no ochre (Table 2). Like at Khotoruk, the grave goods were few: Graves 2, 4, and 5 had none, Grave 3 contained 1 scraper and 1 burin, and Grave 6 had 3 prismatic blades and 39 teeth of small mammals. The most abundant assemblage came from Grave 7, which contained 9 arrowheads with asymmetrical concave base, 7 shanks of composite fishhooks of the Kitoi type (Fig. 6: 4), 4 prismatic blades, 1 shaft fragment of a composite implement, and 1 fragment of a bone implement, for a total of 22 objects (Table 3).

2.1.4. *Khuzhir-Nuge IX*

This mortuary site was located on a subtle depression between two linear bedrock outcrops, about 56 m above the lake on the south-facing slope of a hill rising from Khuzhir-Nuge Cove. Of the few mortuary features, one (Gr. 3) was radiocarbon-dated to the EN. On the surface, the grave was identified by a compact, round arrangement of stones (3 m in diameter), which continued into the grave-pit. Underneath, the interment was resting on its right side with legs flexed and the head pointing north. It was completely covered with red ochre (Table 2). Grave goods consisted of 1 fish-lure (stylistically similar to Kitoi fish imagery), 1 knife, 2 scrapers, 3 prismatic blades (some with retouch), 1 bifacial blade for a composite tool, 1 blade-flake, 5 flakes with retouch, and 1 poorly preserved bone implement, for a total of 15 objects (Table 3).

2.1.5. *Kurma XI*

Six EN graves (No. 20–24 and 27) were found at this mostly EBA cemetery (Weber et al., 2012). They were located on a flat portion of the east-facing slope of a hill about 25–32 m above the lake. Four graves (Nos. 20–23) were organized across the slope into a row along the SW–NE line, with 1.0–2.0 m distances between them. Grave 24 was located about 20 m higher up the slope and Grave 27 was situated on a small ledge about 11 m down the slope. All interments were placed in relatively shallow pits covered by a few compact layers of stones extending into the grave-pits (Fig. 7: 2). One stone structure was round (Gr. 27; 3.5 m in diameter) while all others were oval (1.8–2.4 × 2.4–3.3 m). Most grave-pits were oriented NW–SE though one (Gr. 23) featured an E–W orientation. The top of the pits ranged in depth from 0.25 to 0.43 m below the modern surface.

Preservation of skeletal remains was poor to the extent that none were found in Graves 20 and 23. It is possible that these two graves were either cenotaphs or contained burials of young children (the skeletal remains of which didn't survive), which would be consistent with the small size of the pits. All graves were single interments but body positions varied somewhat (Fig. 7: 6–7): extended supine (Gr. 21 and 24), supine with flexed legs (Gr. 27), and on the right side with slightly flexed legs (Gr. 22), though all heads pointed NW. Body positions of the two surviving interments in the row of four graves differed from one another (Table 2). Grave goods consisted of prismatic blades only: 1 in Grave 21 and 4 in Grave 27 (Fig. 7: 3–5, Table 3). Red ochre was not documented in any of these graves (Table 2).

2.1.6. *Sarminskii Mys*

As mentioned, three graves (Nos. 22, 24, and 34) from this multi-component cemetery (also with LN and EBA graves) have been recently

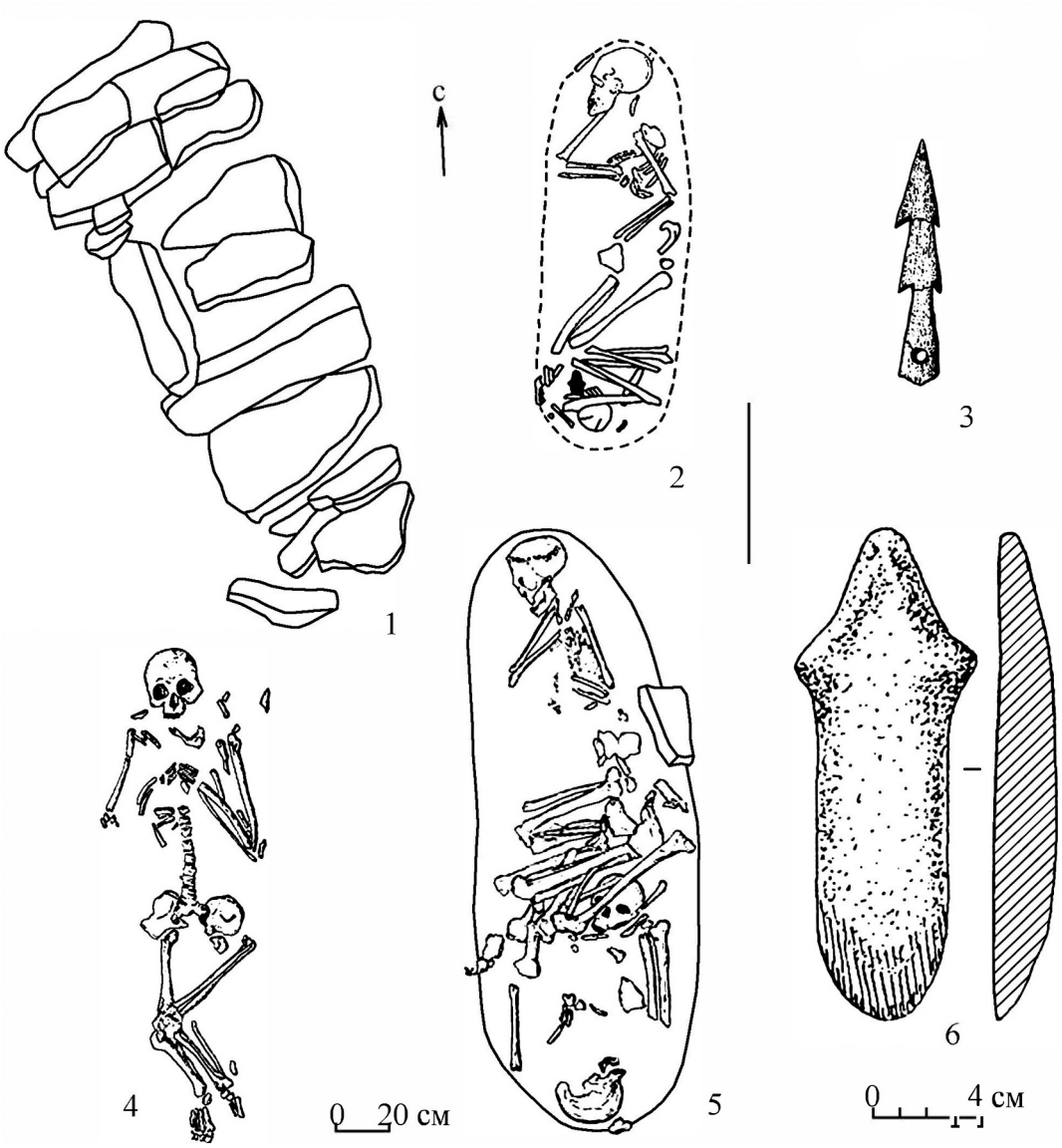

Fig. 4. Khotoruk II: 1–stone surface structure, Grave 7; 2–Grave 5; 3–bone/antler harpoon, Grave 3; 4–Grave 1; 5–Grave 2; 6–adze with "lugs", Grave 5 (after Konopatskii, 1982).

identified by radiocarbon dating as EN. The site was located on the SW slope of the Sarminskii Mys (Fig. 7: 1). The EN graves were located at the SW edge of the cemetery, thus spatially separated from the LN and EBA graves, and about 29–32 m above the lake. Graves 22 and 24 were only a few meters apart from one another while Grave 34 was found about 20 m NE from them. Grave 22 featured a roughly round arrangement of surface stones (2.8 × 3.0 m). Graves 24 and 34 were disturbed in the past and the size and shape of their surface stone structures could not be determined; however, the scatter of stones was about 3 × 4 m in both cases. Grave-pits were oval, oriented NW–SE, and appeared only about 0.10–0.24 m below the modern surface.

All three graves contained single interments. The burial in Grave 22 was laid out in extended supine position with the head pointing NW. Based on a few bones that likely retained their original position, the individual in Grave 24 was also placed in extended supine position. Grave 34 was disturbed to the extent that only a few skeletal elements survived and the position of the burial could not be determined (Table 2). Only Grave 24 contained grave goods: 5 prismatic blades (some with edge-retouch), 1 blade-flake, 1 angle-burin on a prismatic blade, 1 end scraper on a blade-flake, and 1 flake, for a total of 9 lithics (Fig. 7: 8–13; Table 3). No signs of red ochre were observed in any of the graves (Table 2).

2.1.7. *Khuzhir-Nuge XIV*

This predominantly EBA cemetery contained one grave (Gr. 7) which has been recently identified as EN through radiocarbon dating (Weber et al., 2021). The grave was located between two linear bedrock outcrops running parallel to one another about 75–100 m apart on a SE facing slope. It occupied a relatively flat spot close to the lower line of bedrock, about 20 m above the lake and about 50 m SW from the nearest EBA grave. The burial was covered by a compact arrangement of stone slabs about 2.2 × 3.1 m in size with the long axis running E–W and a number of slabs placed directly over the burial inside the pit, the top of which was only ~0.28 m below the modern surface. The body was in extended supine position with the head pointing N (Table 2). Neither grave goods nor red ochre were found in the grave (Table 3).

2.1.8. *Mys Uiuga*

This cemetery was located at the very tip of a cape of the same name, only about 3 km southwest of Kurma XI (Fig. 8: 1). Both Neolithic and

Fig. 5. General view of the Khonkhoiskaia Guba I cemetery photographed from the northwest.

EBA graves have been discovered there with the Neolithic graves being more numerous. While work at this site continues, one grave (Gr. 1) with an EN date has been published (Kichigin et al., 2017; Weber et al., 2021). Unfortunately, the grave was disturbed in the past and it is unclear whether stone structures were present or not. The interment was found only 0.03–0.13 m below the modern surface in extended supine position with the head pointing NNW (Fig. 8: 9).

The grave good assemblage consisted of 1 ceramic vessel (Fig. 8: 10), 1 bone needle case, 1 burin and 1 perforator, both on prismatic blades, 9 flakes, 5 prismatic blades, 2 seal canines, 2 fish vertebrae, and 1 piece of graphite, for a total of 18 items, not counting the last 3 categories (Table 3). The ceramic vessel displayed a complex profile and sharp base. The upper part of the outer surface was decorated with fine cord impressions consistent with the Khaita pottery style. The decoration also consisted of groups of incised lines arranged horizontally around the perimeter or into a herringbone pattern. Red ochre was not observed in the grave (Table 2).

3. Discussion

To facilitate further analysis, the main characteristics of the EN mortuary materials from the Little Sea microregion described above have been summarized in a table format. Table 2 shows such information as grave architecture (use of rocks and birch bark), the number of interments per grave and the type of disposal (i.e., primary or secondary), the age and sex, body position, and orientation of the burials, their arrangement in graves with multiple interments, use of red ochre, as well as presence or absence of a few broad groups of grave goods. Table 3 provides quantitative and morphological details regarding grave goods, which are presented under three main rubrics: lithics, organic objects, and other objects (tube beads and ceramics). The categories within each such rubric are relatively broad (e.g., arrowheads, knives, burins, harpoons, shafts for composite tools) with further morphological details presented in the text when available and considered practical. Table 3 also provides the number of grave goods found in each grave, the number of grave good categories represented, and the number of occurrences for each grave good category within the entire body of mortuary materials analyzed in the paper. For example, Grave 3–1972 at Shamanskii Mys I contained 59 grave goods representing 24 different categories, of which arrowheads of various forms have been found in 2 out of all 26 examined graves. In a few instances red deer tooth pendants and beads have been reported only as numbering a few, several, or many specimens without providing their exact number, so their counts are underrepresented. Unmodified faunal remains are only noted in Table 2 but excluded from Table 3 because they have not been documented, analyzed, and reported in a consistent manner. Thus, adding this information to Table 3 could potentially lead to unwarranted observations and conclusions. However, whenever more information about faunal remains was available, it has been included in the description of mortuary assemblages presented in the Materials section.

Among all EN mortuary materials documented in Cis-Baikal, the best archaeologically visible, although spatially limited to the Angara Valley and Southwest Baikal, is the Kitoi mortuary tradition (Bazaliiskii, 2010). The variation in this large corpus of data (374 burials, 246 graves, and 14 cemeteries) has been quite well described (e.g., Bazaliiskii, 2010; Okladnikov, 1950; Weber, 2020; Weber et al., 2021) and, consequently, the Kitoi mortuary protocol has been used frequently as the main framework of reference to assess other EN mortuary assemblages from the broader region.

The main defining characteristics of the Kitoi mortuary tradition include grave-pits lacking rocks, almost omnipresent use of red ochre over entire burials, extended body position, graves with mostly single but sometimes multiple interments (frequently arranged on many levels and sometimes in the head-to-toe position), and mostly N orientation (S

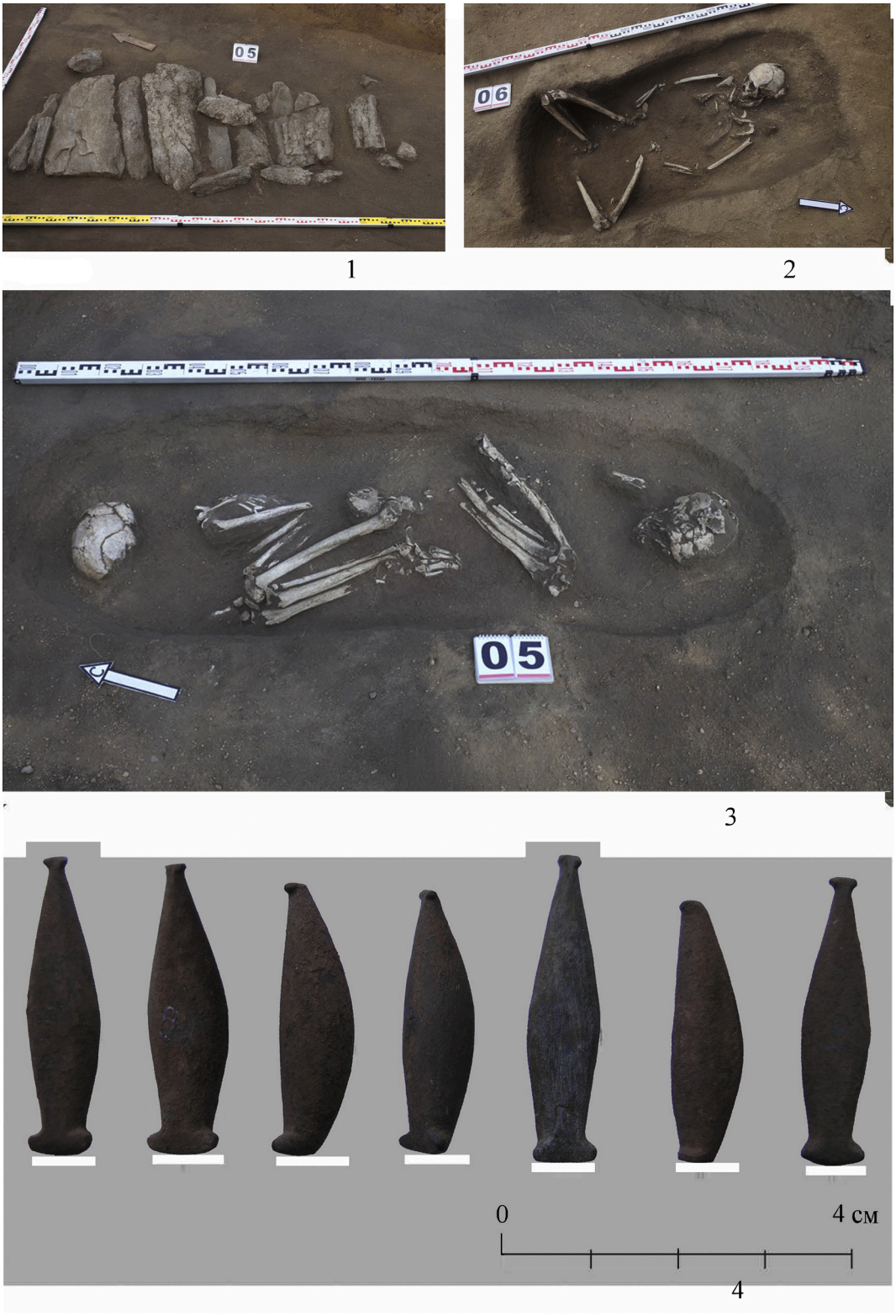

Fig. 6. Khonkhoiskaia Guba I: 1–stone structure inside grave pit, Grave 5; 2–Grave 6; 3–Grave 5; 4–shanks for composite fishhooks, Grave 7.

for head-to-toe burials). Occasionally, burials have missing skulls. While quite rare, the head-to-toe arrangement of burials is still considered a trait diagnostic of the Kitoi mortuary protocol because, to date, it has never been documented in any other Neolithic or EBA graves in Cis-Baikal. Grave goods are quite variable in kind (60–65 categories; Bazaliiskii, 2010) and number (from no grave goods to hundreds). Most common are lithic shanks of composite fishhooks and bifacial arrowheads. Other well-represented categories include a broad range of stone, bone, and antler tools (unilateral harpoons and a range of points and shafts or handles of composite tools), objects made of green nephrite (knives and adzes). Bone or antler bow stiffeners are known from a dozen or so graves. Ceramic vessels, mitre-shaped pots with net

Fig. 7. Graves of the Kurma group: 1–general view of the Sarminskii Mys cemetery photographed from the south; 2–surface stone structure, Kurma XI, Grave 22; 3 and 5 grave goods from Grave 27, Kurma XI; 4, grave goods from Grave 21, Kurma XI; 6–Kurma XI, Grave 22; 7– Kurma XI, Grave 24; 8–13 grave goods, Sarminskii Mys, Grave 24.

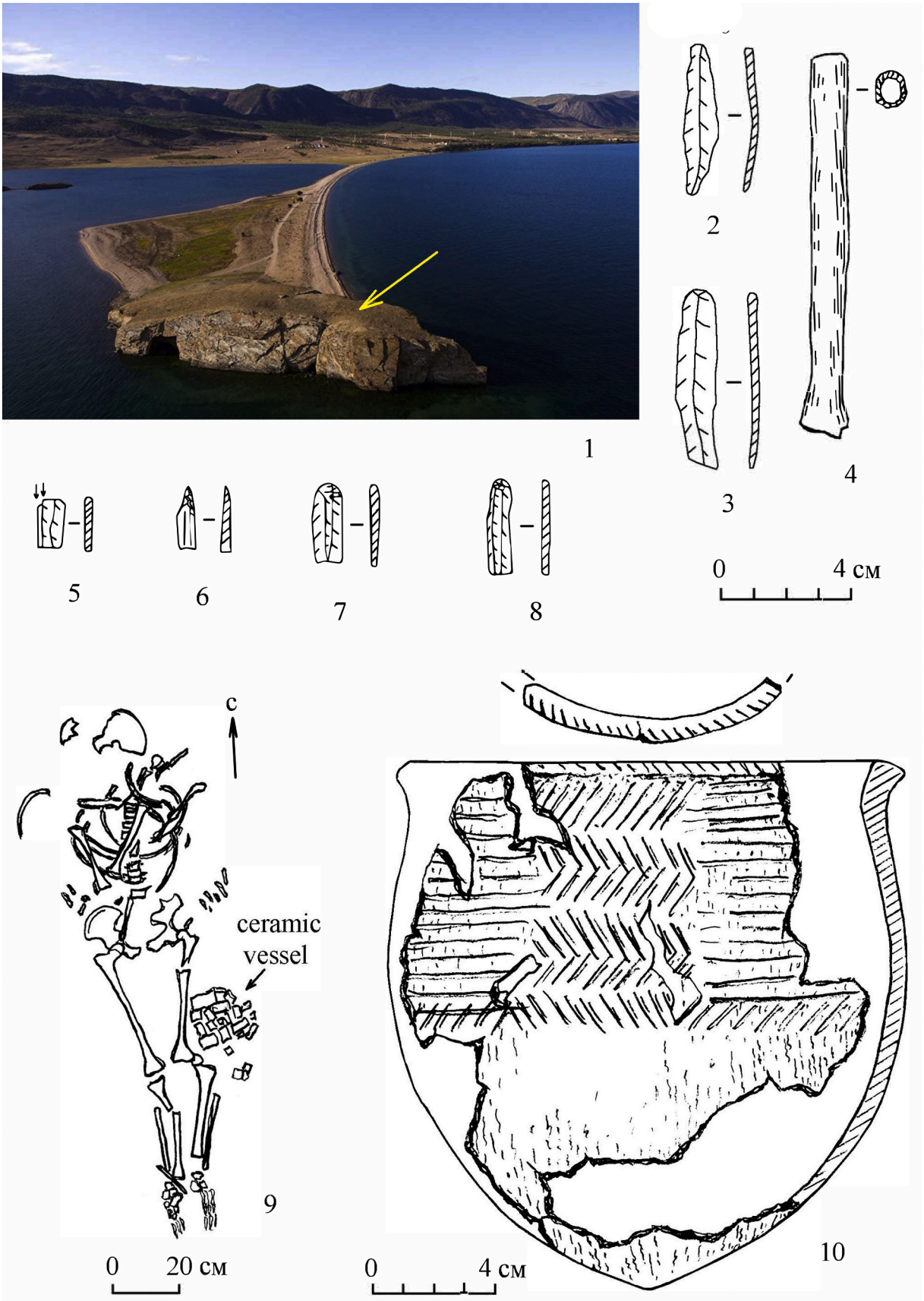

Fig. 8. Mys Uiuga: 1–general view of the cemetery photographed from the south; 2–8 and 10–grave goods, Grave 1; 9–Grave 1 (after Kichigin, 2014).

impressions, are very rare. Common ornaments include a range of rings, beads, pendants made of red deer canines, boar tusks, and bone. Mother-of-pearl pendants and zoomorphic art (moose heads, fish, and seal) occur too but rarely. While differences between cemeteries do exist (e.g., regarding the perimortem removal of the head, post-mortem disturbances, and bear or fire rituals), many of the defining mortuary traits co-occur quite consistently, making graves of the Kitoi mortuary tradition rather obvious to identify.

The following analysis attempts to sort the variation displayed by Little Sea EN cemeteries into two groups: one that shows similarities with the Kitoi mortuary protocol and one that does not or, at least, where such similarities are much less pronounced.[2]

4. The Khotoruk group

The Khotoruk Group, currently known from 4 cemeteries (Khotoruk II, Shamanskii Mys, Khonkhoiskaia Guba, and Khuzhir-Nuge IX) with the total of 15 graves and 22 burials, shows— as a unit— several similarities with the Kitoi mortuary tradition of the Angara and Southwest Baikal (Table 2). These include a few characteristics that are considered defining the Kitoi mortuary protocol such as the use of red ochre, graves with multiple interments, the arrangement of interments on top of one another and in the head-to-toe position, and the generally N orientation of the head. Similarities with Kitoi include also a few kinds of grave goods, although, admittedly, they come mostly from two graves only (Gr. 3–1972 at Shamanskii Mys I and Gr. 7 at Khonkoiskaia Guba). Due to the variation in the prevalence of these traits, central to the identification of this mortuary group is the use of red ochre, which was observed on 18 out of 22 burials: 14 fully covered and 4 with small stains (Table 2).

In addition to similarities with the Kitoi mortuary protocol, this material shows also some differences and some local characteristics, the latter displaying much variation too (Table 2). With the exception of Grave 7 at Khonkhoiskaia Guba I, the graves of the Khotoruk Group feature surface and/or grave-pit stone structures. The surface structures measure about 2.5–4.5 × 1.3–3.0 and are generally similar in size to the grave-pits. The most frequent body position is with flexed legs ($n = 20$), either on a side ($n = 13$) or supine ($n = 7$). One interment, a pile of bones in Grave 5 at Khotoruk II, is considered to be a secondary burial, a practice generally rare in Kitoi (Okladnikov, 1950: 406–407; Bazaliiskii, 2012: 60–68). Outside the Little Sea microregion, flexed burials also exist in graves of this age, having been documented for the LM–EN burials at the Fofanovo cemetery in the Selenga delta (Gerasimov and Chernykh, 1975: 23–32; White et al., 2020a, 2020b) and for a few interments at Shamanka II, located on the coast of the Kultuk Bay in Southwest Baikal (Bazaliiskii, 2012: 59–60, 68–69). At Fofanovo, however, the burial orientation is mainly SE while stone structures are absent at both cemeteries.

Most graves of the Khotoruk Group contain single interments but double ($n = 5$) and triple (n = 1) burials are also present, together accounting for 59% of all burials. Graves with double burials are known at Khotoruk II and Khonkhoiskaia Guba I, in the latter including the unique toe-to-toe arrangement. The interments in Grave 4 at Khotoruk II are arranged on top of one another while in Grave 5 they are on the same level. Grave 2 at Khotoruk II has three burials in two different positions: 1 on a side with slightly flexed legs and 2 supine with flexed legs, all in the head-to-toe arrangement. The two burials in Grave 3 at Khonkhoiskaia Guba were probably also interred head-to-toe. While the dominant burial orientation is to the N ($n = 15$), minor deviations in both directions are frequent. In Grave 3–1972 at Shamanskii Mys I, however, the head is pointing E.

Grave 3–1972 from Shamanskii Mys I stands out from the other graves of this group also due to several additional unusual mortuary characteristics. First, the pit contained a layer of birch bark supported by wooden stakes constructed over the human burial. Second, two dog interments were placed on top of the birch bark layer. Third, the human burial featured not only the rare orientation (head pointing E) but it was placed on top of yet another layer of birch bark spread over the pit floor. And fourth, the grave good assemblage was by far the richest (59 objects excluding red deer canine pendants and tube beads) and most diverse (24 categories) of all Little Sea EN graves (Table 3). However, compared to the Angara and Southwest Baikal Kitoi graves, it would be about average in this regard.

Some of the unusual characteristics documented in Grave 3–1972 at Shamanskii Mys find analogies among Kitoi graves on the Angara and Southwest Baikal. Wooden stakes were documented in three graves at the Kitoi cemetery excavated by N.I. Vitkovskii in 1880–81 (Okladnikov, 1950: 406) while Grave 26 at Shamanka II on Southwest Baikal contained a burial of a dog (Bazaliiskii, 2012: 49) and Grave 8 at Lokomotiv-Raisovet, dating to the Late Mesolithic, included a wolf interment (Bazaliiskiy and Savelyev, 2003; Losey et al., 2011). Analogies also exist with regard to the kind and morphology of grave goods. These include a few typical Kitoi artifacts such as shanks for composite fishhooks with a frontal hook attachment, arrowheads with an asymmetrical concave base, harpoons with a perforation at the base, and slotted bone/antler shafts for composite tools. However, the carbon and nitrogen stable isotope measurements available for this individual suggest a diet consistent with the Game-Fish-Seal diet displayed by most EN, LN, and EBA individuals from the Little Sea microregion (Weber et al., 2011, 2016, 2021).

With 22 items, Grave 7 at Khonkhoiskaia Guba comes next in terms of the number of grave goods though the assemblage is considerably less diverse for only 5 categories are represented (Table 3); however, it includes arrowheads with asymmetrical concave bases and shanks for composite fishhooks, both common in Kitoi graves. Taken together, these two graves account for close to 80% (81 items) of all grave goods of this group. In both cases, these large numbers are mainly accounted for by items directly related to fishing (e.g., shanks or hooks for composite fishhooks) and bow hunting (arrowheads; Table 3).

One other grave (Khuzhir-Nuge IX, Gr. 3) had 15 objects, mostly retouched flakes and prismatic blades, but 8 graves had no more than a few, and in 5 graves they were absent entirely. Thus, excluding the two graves with highest number of items and grave good categories (Gr. 3–1972 at Shamanskii Mys and Gr. 7 at Khonkhoiskaia Guba), the assemblage of grave goods documented in the remaining 13 graves is generally poor in terms of quantity (25 items), much less diverse (14 categories), and also lacking objects of clear diagnostic value in culture historical terms. In fact, the assemblage appears to be more “Mesolithic” than “Neolithic” in its general cultural character.

The stone fish-lure from Grave 3 at Khuzhir-Nuge IX is stylistically consistent with Kitoi fish images classified as ‘Group 2’ by S.V. Studzitskaia (1976: 80), with further analogies from EN layers at a few campsites along the coast of Lake Baikal from the source of the Angara to the Little Sea (Novikov and Goriunova, 2016). Radiocarbon dates obtained on herbivore bones for the Layers VI–V (lower) at Sagan-Zaba II with similar fish-lures range from 7880 to 6319 cal. BP[3] (Novikov and Goriunova, 2016; Nomokonova et al., 2013). Lastly, the ceramic vessel with net impressions and decorated with a line of small pits from Grave 3–1972 at Shamanskii Mys I resembles pots from the Lokomotiv and Kitoi cemeteries on the Angara, and also from Shamanka II, however rare such pots are at these two sites (Bazaliiskii, 2012: 67).

[2] In other papers presented in this special issue (Bronk Ramsey et al., 2021; Weber et al., 2021; Weber, 2020), all graves discussed in this paper are part of a broader geographic unit referred to as the Khin Group, which includes also graves of similar age from the Angara Valley and the Upper Lena area.

[3] All calibrated ages are reported at the 95% confidence interval.

Table 2
Summary of main Early Neolithic mortuary characteristics in the Little Sea micro-region.

Cemetery	Grave	Burial	Master ID	Age	Sex	Surface stone structures	Grave-pit stone structures	Birch bark cover	Single burial	Double burial side-by-side	Double burial stacked	Head-to-toe	Double burial toe-to-toe	Mutiple burials	Primary burial	Secondary burial	Unknown	Extended supine	Supine w. flexed legs	On side legs slightly flexed	On side legs flexed	On side legs tightly flexed	Head pointing N, NNW,NNE	Head pointing NW	Head pointing E	Head pointing S, SSW	Full coverage by ochre	Spots of ochre	Lithic grave goods	Bone/antler grave goods	Ceramics	No grave goods	Faunal remains	Notes
Khotoruk Group																																		
Khotoruk II	Gr. 1	B. 1	KHO_1977.001	?	U	+	+		+						+				+				+					+	+					
	Gr. 2	pit				+	+					+		+																				
		B. 1	KHO_1977.002.01	14+ y.	U										+						+		+				+			+				
		B. 2	KHO_1977.002.02	?	U										+				?								+							
		B. 3	KHO_1977.002.03	?	U										+				+							+	+							
	Gr. 3	pit				+					+																					+	
		B. 1	KHO_1977.003.01	?	U										+						+		+					+						
		B. 2	KHO_1977.003.02	?	U										+						+		+					+		+				
	Gr. 4	pit				+	+				?																+							
		B. 1	KHO_1978.004.01	20+ y.	U										+				+				+							+				+	Main burial
		B. 2	KHO_1978.004.02	14+ y.	U												+																	Skull fragment with mandible only
	Gr. 5	pit				+	+			+																								
		B. 1	KHO_1978.005.01	?	U										+						+		+					+		+					
		B. 2	KHO_1978.005.02	?	U											+																			
	Gr. 6	B. 1	KHO_1978.006	?	U	+			+						+						+		+					+				+		
	Gr. 7	B. 1	KHO_1978.007	14+ y.	U	+	+		+						+				+				+					+				+		
Shamanskii Mys I	Gr. 3–1972	B. 1	SHM_1972.003	20+ y.	U	+	+	+	+						+				+						+			+		+	+	+		+	
Khonkhoiskaia Guba I	Gr. 2	pit					+																											
		B. 1	KG1_2004.002.01	20+ y.	U				+						+								+									+		
	Gr. 3	pit					+					?																	+					
		B. 1	KG1_2006.003.01	20+ y.	U										+								+					+						
		B. 2	KG1_2006.003.02	20+ y.	U										+												+	+						
	Gr. 4	B. 1	KG1_2006.004	20+ y.	U		+		+						+								+					+				+		
	Gr. 5	pit					+						+																			+		
		B. 1	KG1_2013.005.01	20+ y.	U										+								+					+						
		B. 2	KG1_2013.005.02	20+ y.	U										+								+					+						
	Gr. 6	B. 1	KG1_2013.006	15+ y.	U	+	+		+						+					+				+						+				+	
	Gr. 7	B. 1	KG1_2013.007	15+ y.	U				+						+							+		+				+		+	+				
Khuzhir-Nuge IX	Gr. 3	B. 1	KN9_2010.003	10–15 y.	U	+	+		+						+							+		+				+		+	+				
Subtotals	15		22			10	12	1	9	1	2			1	20	1	1	0	7	0	7	5	15	0	1	3	14	4	7	6	1	5	4	
Kurma Group																																		
Kurma XI	Gr. 20					+	+		?								+							?								+		No human skeleteal remains
	Gr. 21	B. 1	KUR_2003.021	?	U	+	+		+						+			+						+					+					
	Gr. 22	B. 1	KUR_2003.022	50+ y.	F	+	+		+						+					+				+								+		
	Gr. 23					+	+		?								+															+		No human skeleteal remains
	Gr. 24	B. 1	KUR_2003.024	20–35 y.	F	+	+		+						+			+						+								+		
	Gr. 27	B. 1	KUR_2003.027	?	U	+	+		+						+				+					+					+					
Sarminskii Mys	Gr. 22	B. 1	SMS_1987.022	20–35 y.	FP	+			+						+			+						+								+		
	Gr. 24	B. 1	SMS_1987.024	20+ y.	U	+			+						+			?						+					+					
	Gr. 34	B. 1	SMS_1987.034	12+ y.	U	+			?								+													+				
Khuzhir-Nuge XIV	Gr. 7	B. 1	K14_1997.007	25–35 y.	MP	+	+		+						+			+					+								+		
Mys Uiuga	Gr. 1	B. 1	MUG_2013.001	50+ y.	F				+						+			+						+					+	+	+		+	
Subtotals	11		9			10	7	0	11	0	0			0	8	0	3	6	1	1	0	0	1	8	0	0	0	0	4	1	1	7	1	
Totals	26		31			20	19	1	20	1	2			1	28	1	4	6	8	1	7	5	16	8	1	3	14	4	11	7	2	12	5	

Table 3
Summary of Early Neolithic grave goods in the Little Sea micro-region.

No.	Cemetery	Grave No.	Number of burials	Bow & arrow		Composite tools or weapons			Fishing tackle					Ornaments			Ceramic pots	Other grave goods															Total grave goods	No. of grave good categories
																		Lithic objects								Organic objects								
				Arrowheads	Bow stiffeners	Biafaces for composite tools	Prismatic blades	Shafts of composite tools	Knives	Fish-lures	Harpoons	Composite fishhook barbs	Shanks for composite fishhooks	Fishing reels	Split boar tusks	Red deer tooth pendants	Beads		Scrapers	Burins	Perforators	Adzes with "lugs"	Slate pieces with sawing marks	Flakes	Abraders	Pebble-flakers	Bone/antler points	Bone fleshers (лощила)	Spoons/spatulas	Needle boxes	Pressure-flakers	Birch bark containers	Other organic objects		
	Khotoruk Group																																	
1	Khotoruk II	Gr. 1	1															1														1	1
		Gr. 2	3													+																+	1
		Gr. 3	2					1			1																					2	2
		Gr. 4	2												1	+																1	2
		Gr. 5	2																		1											1	1
		Gr. 6	1																														
		Gr. 7	1																														
2	Shamanskii Mys I	Gr. 3–1972	1	2	1	1	2	1	1		3	10	17	1	1	+	+	1	2				2	1	4	+	2	3	1		2	1		59	24
3	Khonkhoiskaia Guba I	Gr. 2	1																														
		Gr. 3	2															1	1													2	2
		Gr. 4	1																														
		Gr. 5	2																														
		Gr. 6	1				3																									3	1
		Gr. 7	1	9			4	1					7																			1	22	5
4	Khuzhir-Nuge IX	Gr. 3	1			1	3		1	1								2					6									1	15	7
	Subtotals	15	22	11	1	2	12	3	2	1	4	10	24	1	2	+	+	1	6	1		1	2	7	4	+	2	3	1		2	1	2	106	28
	Category occurances		15	2	1	2	4	3	2	1	2	1	2	1	2	3	1	1	4	1	0	1	1	2	1	1	1	1	1	0	1	1	2	10	
	Kurma Group																																	
5	Kurma IX	Gr. 20																															
		Gr. 21	1				1																									1	1
		Gr. 22	1																														
		Gr. 23																															
		Gr. 24	1																														
		Gr. 27	1				4																									4	1
6	Sarminskii Mys	Gr. 22	1																														
		Gr. 24	1				5											1	1				2									9	4
		Gr. 34	1																														
7	Khuzhir-Nuge XIV	Gr. 7	1																														
8	Mys Uiuga	Gr. 1	1				5										1		1	1			9						1			18	6
	Subtotals	11	9				15										1	1	2	1			11						1			32	7
	Category occurances		9	0	0	0	4	0	0	0	0	0	0	0	0	0	0	1	1	2	1	0	0	2	0	0	0	0	0	1	0	0	0	4	
	Totals	26	31	11	1	2	27	3	2	1	4	10	24	1	2	+	+	2	7	3	1	1	2	18	4	+	2	3	1	1	2	1	2	138	30
	Totals of category occurrences		24	2	1	2	8	3	2	1	2	1	2	1	2	3	1	2	5	3	1	1	1	4	1	1	1	1	1	1	1	1	2	58	
	Total graves with grave goods																																14	

5. The Kurma group

The Kurma Group is defined based on materials from the remaining 4 cemeteries (Kurma XI, Sarminskii Mys, Khuzhir-Nuge XIV, and Mys Uiuga) with the total of 11 graves and 9 burials (Table 2). It is characterized mainly by graves with single burials only, the dominance of the extended supine body position (documented in 5 instances, although 2 burials from Kurma XI were somewhat flexed) as well as the absence of similarities with the Kitoi mortuary protocol that typify the Khotoruk Group, including the lack of red ochre, graves with multiple burials, and arrowheads with asymmetrical concave base and composite fishhook shanks among grave goods (Tables 2 and 3).

To be sure, similarities with the Khotoruk Group do exist: the presence of surface and grave-pit stone structures (2.4–3.3 × 1.8–2.8, about the same size as in the graves of the Khotoruk Group) and the general N orientation of the burials (with some inclinations to the W). The grave good assemblage is equally poor, if not poorer, in number (32 objects from 11 graves) and lacking in diversity (7 categories), consisting mainly of lithics (prismatic blades, flakes, burins, scrapers etc.). Seven out of 11 graves had no objects at all and only 2 graves had more than 1 category of grave goods (Table 3). With the exception of the pottery (see below), the grave goods of the Kurma and Khotoruk Groups (excluding the two graves with more numerous and diverse assemblages) are morphologically essentially the same.

The single Khaita type ceramic vessel (Gr. 1 at Mys Uiuga) is the only element of material culture the chronology of which can be somewhat narrowed down. Although this is its first occurrence in a mortuary context, the Khaita style is well known from a number of campsites across Cis-Baikal. For example, it has been documented in Layer VI at Sagan-Zaba II, Layer VIII at Bugul'deika I (both on Lake Baikal), in Layers VI and Va at Gorelyi Les, and Layers V and Va at Ust'-Khaita (both on the Belaia River, the left tributary of the Angara) as well as a few other sites (Savel'ev, 1989; Savel'ev et al., 2001; Goriunova et al., 2011; Berdnikov, 2013; Timoshchenko and Bocharova, 2016; Goriunova and Novikov, 2017). The available AMS dates obtained on deer bones from these sites are generally consistent with a Late Mesolithic and EN chronology for the Khaita style. The dates for Layer VI at Sagan-Zaba II range from ~7200 to ~7150 BP (8160–7880 cal. BP), while for Layer VIII at Bugul'deika I the single available date is 6870 ± 20 BP (UCIAMS-183007; 7750–7660 cal. BP) (Nomokonova et al., 2013; Timoshchenko and Bocharova, 2016). For the Gorelyi Les and Ust'-Khaita sites, the dates for layers with the Khaita style pottery range from ~7300 to ~6100 BP (8400–6900 cal. BP) (Savel'ev et al., 2001; Losey et al., 2017). Overall then, the chronological range for the Khaita pottery presently appears to be quite broad and generally consistent with the chronology of the Kurma Group as discussed below.

6. Chronology

As mentioned, the extensive program conducted by the Baikal Archaeology Project of radiocarbon dating the Middle Holocene burials from the Cis-Baikal region, and the Little Sea area in particular, produced a large body of new chronological data (Bronk Ramsey et al., 2021; Weber et al., 2006; Weber et al., 2016, 2021). Importantly, in many cases entire cemeteries, rather than a sample of burials, were dated using human skeletal elements. Currently, there are 26 radiocarbon dates for graves of the Khotoruk and Kurma Groups examined here. Two of these are on wood samples (both for Grave 3–1972 at Shamanskii Mys I) measured in Russian laboratories and the remaining ones are all on human skeletal remains (Table 4). Of the second group of dates, only the AMS dates obtained from the ORAU laboratory, University of Oxford, have associated stable isotope results and thus can be readily corrected for the freshwater reservoir effect (FRE; e.g., Schulting et al., 2020; Weber et al., 2016; references therein). Additionally, one more date for Grave 3–1972 at Shamanskii Mys I from the Isotrace laboratory, University of Toronto, can be corrected for the FRE using stable isotope results generated for the same skeletal element at the University of Calgary (Weber et al., 2011). As one of the ORAU dates cannot be FRE-corrected for reasons mentioned in Table 4, the following analysis is limited to 15 dates from Oxford, 1 date from Toronto, and the 2 dates on wood samples which do not require an FRE correction. To keep the matter simple, the discussion employs only corrected radiocarbon dates BP, although Table 4 also shows calibrated BP ranges at 95% confidence intervals along with mean calibrated dates and associated errors. Likewise, Fig. 9 shows results of the analysis using the "KDE_Model" and "Sum" functions, also expressed in calibrated years BP. Additional results of statistical analysis and modeling of this dataset as well as dates representing the other microregions and archaeological periods within Middle Holocene Cis-Baikal are presented in separate studies (Bronk Ramsey et al., 2021; Weber et al., 2021).

The chronological analysis starts with an assessment of the three dates available for Grave 3–1972 at Shamanskii Mys I. Recollect that, aside from the unusual body position and orientation of the burial, of all EN mortuary assemblages currently known from the Little Sea microregion, this grave shows the most similarities with the Kitoi mortuary tradition of the Angara and Southwest Baikal. The FRE-corrected radiocarbon dates for the Angara and Southwest Baikal range from 6704 ± 74 BP to 5939 ± 74 BP and from 6911 ± 73 BP to 5777 ± 74 BP, respectively (Fig. 9). While all three dates for Grave 3–1972 at Shamanskii Mys I (SOAN-790, 6550 ± 35 BP; TO-10311, 6038 ± 95 BP FRE-corrected; Le-1976, 5720 ± 50 BP) generally fit within these chronological boundaries, their utility is compromised by the fact that they are quite far apart from one another and, statistically, do not combine. Lacking any additional clues to assess which of the three dates is most accurate, it is best that all three are omitted from further discussion. Clearly, the best approach is to resample the surviving human skeletal remains and date them again. For now, the rest of the discussion must focus on the 9 dates for the Khotoruk Group and the 6 dates for the Kurma Group, for a total of 15 radiocarbon dates from 7 cemeteries.

Although the dataset is rather small, several important observations can nevertheless be offered (Tables 4 and 5; Fig. 9). First, it seems that the development of these two mortuary groups essentially paralleled one another from start to end. Second, regardless whether these two groups are considered together or separately, their formation appears to predate the very well-dated formation of the EN Kitoi mortuary tradition in the Angara valley and on Southwest Baikal by a few centuries and, likewise, they appear to terminate a few centuries before the end of the Kitoi. Third, this suggests that the development of the Khotoruk and Kurma Groups in the Little Sea was independent of the developments on the Angara and Southwest Baikal where the Kitoi mortuary pattern formed. Fourth, connections between the three areas clearly existed but they are best visible in the graves dating to the second half of the Khotoruk Group's existence, as suggested by the date for Grave 7 at Khonkhoiskaia Guba I with composite fishhook shanks of the Kitoi type and arrowheads with asymmetrical concave bases. This assertion is, perhaps, further supported by the age of Grave 3–1972 at Shamanskii Mys I, also with such fishhook shanks and arrowheads, assuming at least some credibility of the three dates available for this grave. No grave dating to the first half of the Khotoruk Group shows these two kinds of objects. Fifth, the copious use of red ochre in the graves of the Khotoruk Group seems to parallel its application in the Kitoi mortuary protocol, for its use in Grave 7 at Khotoruk, the oldest within the group and much older than the oldest Kitoi graves, is expressed only by a small stain. Sixth, the chronological position of a few other Kitoi mortuary characteristics documented among the graves of the Khotoruk Group (i.e., head-to-toe burials, adzes with lugs or fish-lures, the latter two of the "Kitoi" style) also seems to parallel their occurrence in Kitoi graves of the Angara and Southwest Baikal (Tables 2, 3 and 4).

Given that the 15 dates (FRE-corrected) span a period of ~1200 radiocarbon years and come from 7 cemeteries, not much can be inferred with regards to the spatial and chronological aspects of cemetery use. All cemeteries are small and most appear to have been used

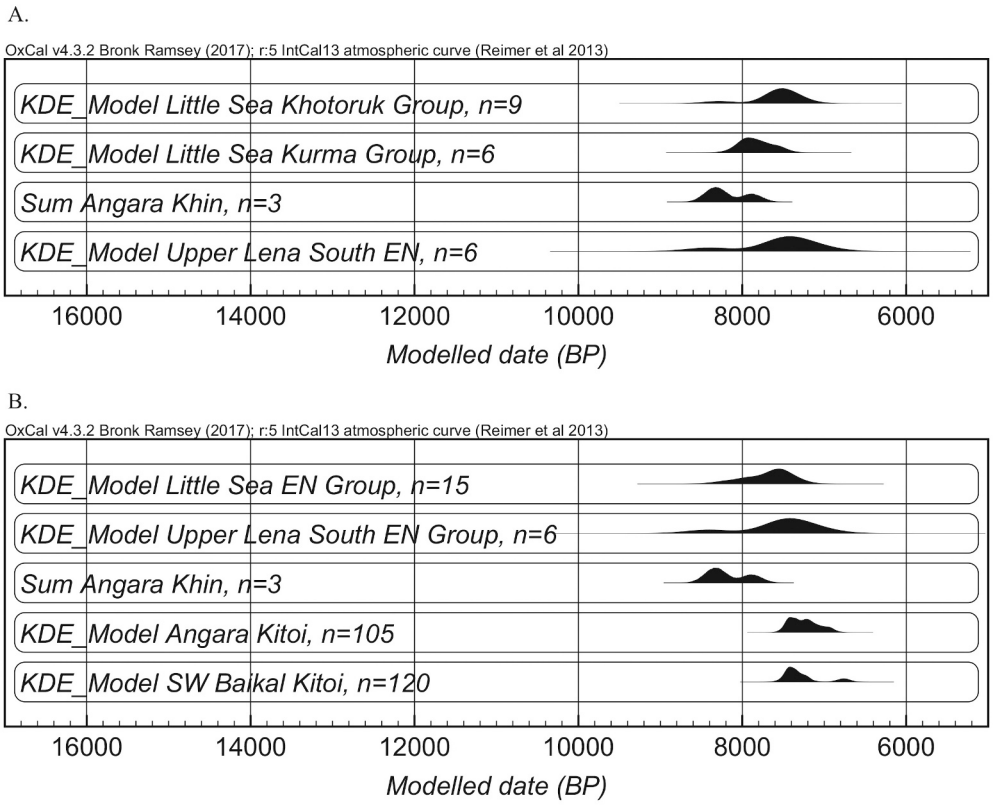

Fig. 9. Chronological analysis of radiocarbon dates for Late Mesolithic and Early Neolithic graves from the Cis-Baikal region (after Weber et al., 2021; Bronk Ramsey et al., 2021).
A. Dates for the Khotoruk and Kurma Groups, Khin Group from the Angara, and Upper Lena Early Neolithic graves.
B. Dates for Little Sea (Khotoruk and Kurma Groups together), Upper Lena Early Neolithic graves, Angara Khin graves, and Angara and Southwest Baikal Kitoi graves.

very sporadically, although at some (e.g., Khotoruk) a few graves seem to have been built around the same time (Table 4). Also, if the distinction between the Khotoruk and Kurma Groups has any significance in terms of social organization, these two social units must have functioned spatially side-by-side for much of their existence. For example, the cemeteries of the Kurma Group seem to be very close to one another, in close proximity to several cemeteries of the Khotoruk Group, and are absent on Olkhon Island (Fig. 1). On the other hand, the spatial separation between cemeteries of the Khotoruk Group is markedly much larger and two of them are located on Ol'khon Island. The cultural significance of this pattern, if it is genuine, is difficult to assess at present.

The last matter to address regards the radiocarbon dates associated with the net-impressed (Grave 3–1972 at Shamanskii Mys I; Khotoruk Group) and cord-impressed, or Khaita, (Grave 1 at Mys Uiuga; Kurma Group) pottery styles. Both are known throughout Cis-Baikal and both styles are commonly considered part of the cultural package defining the beginning of the EN period in the region (McKenzie, 2009). In the Little Sea area, there are a few campsites with EN layers that contain net-impressed pottery only while at others, both styles are present (Goriunova and Novikov, 2017). Although the radiocarbon dates from campsites suggest that both pottery styles were in use around the same time, the dates available for the two relevant graves indicate a much earlier appearance of the Khaita style.

In sum, since at the scale of the entire Cis-Baikal the chronological boundaries of the EN period are very well demarcated by the very large set of 225 FRE-corrected radiocarbon dates, ranging from 6911 ± 73 to 5777 ± 74 BP, available for the Kitoi mortuary tradition (Weber et al., 2021), the Khotoruk and Kurma Groups appear to date between 7533 ± 65 and 6340 ± 63 B.P. (FRE-corrected; Table 4, Fig. 9). Following the long-standing tradition of defining the Neolithic period in Cis-Baikal based on technological criteria (i.e., the appearance of the bow-and-arrow, ground or polished stone tools, and ceramic vessels) the Mesolithic-like character of much of the material culture represented in the graves of the Khotoruk and Kurma Groups is obvious. Moreover, while two graves belonging to the second half of the existence of these two groups (Gr. 3–1972 at Shamanskii Mys and Gr. 7 at Khonkhoiskaia Guba) do show close similarities with the Kitoi pattern in several mortuary characteristics, most of the later graves in both groups do not. Instead, their material culture is similar to the much older Khotoruk and Kurma graves, regardless of their group classification.

Thus, assuming that the EN in Cis-Baikal begins with the formation of the Kitoi cultural package, in which the Neolithic-defining characteristics are unequivocally expressed, the Khotoruk and Kurma Groups appear to straddle the Late Mesolithic (LM) to EN transition: their origin and roughly the first third, or even half, of their existence belong to the LM, while their latter portion parallel the first portion of the EN. Alternatively, one may want to push back the start of the EN by a few centuries to encompass the chronological period of the Khotoruk and Kurma Groups. The problem with this proposition is that the Neolithic package is poorly expressed during this period, and in the first half of the Khotoruk–Kurma period is limited to the Khaita pottery. Obviously, while these period definitions and assignments are to some extent arbitrary, they are based on changes in material culture and mortuary practices that are believed to be meaningful of broader cultural processes affecting these HG groups. This matter will be a topic of future research and discussion. Lastly, both Little Sea EN mortuary groups appear to end before the end of the EN Kitoi mortuary tradition.

7. Summary

Presently, there are 26 graves of the Khotoruk and Kurma Groups, together with 31 burials from 8 localities documented for the Little Sea microregion. The Khotoruk Group (15 graves and 22 burials) is a much larger sample than the Kurma Group (11 graves with 9 documented interments) although the number of cemeteries, 4 of each, is the same. However, the work in progress at Mys Uiuga is bound to redress this imbalance (A.V. Kharinskii and D.E. Kichigin, personal communication).

Table 4
Radiocarbon dates for Early Neolithic graves in the Little Sea micro-region.

No.	Cemetery	Master_ID	Age y.	Sex	Lab No.	Date BP	±	Correction	Corrected Date BP	±	Cal age BP 95%	Mean Cal Date BP	±
Khotoruk Group: ORAU dates													
1	Khotoruk II	KHO_1978.007	14+	U	OxA-25118	7657	39	Little Sea	7533	65	8429–8189	8332	67
2	Khuzhir-Nuge IX	KN9_2010.003	10–15	U	OxA-35078	6841	34	Little Sea	6799	62	7785–7525	7646	52
3	Khankhoiskaia Guba I	KG1_2013.006	15+	U	OxA-30601	7146	36	Little Sea	6783	63	7749–7513	7634	51
4	Khotoruk II	KHO_1978.004.02	14+	U	OxA-25119	6790	37	Little Sea	6669	64	7652–7435	7540	51
5	Khotoruk II	KHO_1978.005.01	20+	U	OxA-25156	6901	38	Little Sea	6621	64	7595–7425	7510	48
6	Khotoruk II	KHO_1977.002.01	14+	U	OxA-37255	6784	37	Little Sea	6611	64	7590–7423	7505	49
7	Khotoruk II	KHO_1978.004.01	20+	U	OxA-37256	6746	36	Little Sea	6611	63	7587–7424	7505	48
8	Khankhoiskaia Guba I	KG1_2013.005.01	20+	U	OxA-30600	6786	37	Little Sea	6388	64	7428–7176	7323	65
9	Khankhoiskaia Guba I	KG1_2013.007	15+	U	OxA-30602	6782	35	Little Sea	6340	63	7420–7163	7275	77
Khotoruk Group: other dates													
10	Shamanski Mys I	SHM_1972.003	20+	U	TO-10311	6310	80	Little Sea	6038	95			
11	Shamanski Mys I	SHM_1972.003	20+	U	SOAN-790	6550	35	n/a	n/a	n/a			
12	Shamanski Mys I	SHM_1972.003	20+	U	Le-1076	5720	50	n/a	n/a	n/a			
13	Khotoruk II	KHO_1977.002.01	14+	U	TO-04824	7020	70	Missing stable isotope results; cannot correct for FRE.					
14	Khotoruk II	KHO_1977.002.03	?	U	TO-04826	6770	60	Missing stable isotope results; cannot correct for FRE.					
15	Khotoruk II	KHO_1978.005.01	20+	U	TO-04825	6550	70	Missing stable isotope results; cannot correct for FRE.					
Kurma Group: ORAU dates													
1	Kurma XI	KUR_2003.024	20–35	F	OxA-25138	7474	37	Little Sea	7237	64	8177–7955	8066	66
2	Khuzhir-Nuge XIV	K14_1997.007	25–35	MP	OxA-33346	7238	40	Little Sea	7149	65	8157–7843	7975	70
3	Mys Uiuga	MUG_2013.001	50+	F	OxA-33242	7387	38	Little Sea	7090	64	8025–7763	7910	63
4	Sarminskii Mys	SMS_1987.022	20–35	FP	OxA-25570	7078	38	Little Sea	6942	64	7931–7667	7781	69
5	Kurma XI	KUR_2003.022	50+	F	OxA-25137	7019	36	Little Sea	6887	63	7915–7599	7731	66
6	Sarminskii Mys	SMS_1987.024	20+	U	OxA-34509, 35007	n/a	n/a	Little Sea	6641	47	7584–7439	7521	39
7	Sarminskii Mys	SMS_1987.034	12+	U	OxA-34508	7415	45	Missing stable isotope results; cannot correct for FRE.					
Kurma Group: Other dates													
8	Kurma XI	KUR_2003.021	?	U	TO-11680	6450	80	Missing stable isotope results; cannot correct for FRE.					
9	Kurma XI	KUR_2003.022	50+	F	TO-11681	6340	120	Missing stable isotope results; cannot correct for FRE.					
10	Kurma XI	KUR_2003.024	20–35	F	TO-11682	5850	70	Missing stable isotope results; cannot correct for FRE.					
11	Mys Uiuga	MUG_2013.001	50+	F	Beta-432253	6910	30	Missing stable isotope results; cannot correct for FRE.					

Note: Only corrected dates on human skeletal remains are calibrated.

Graves of similar age and kind are also known from the other micro-regions of the broader Cis-Baikal but there they are much fewer in number (Bazaliiskii, 2012; Weber et al., 2016, 2021) and, thus, insufficient for any classificatory attempts. All that can be said about them in this regard is that they are definitely non-Kitoi and that many also show aspects of the Mesolithic material culture. In the Little Sea microregion, variation in such mortuary characteristics as the presence or absence of red ochre and surface or grave-pit stone structures, number of interments, body position and orientation, morphology of grave goods, etc., suggest the presence of two mortuary groups (traditions?) in the area. Some graves belonging to the Khotoruk Group appear to display a few similarities with the Kitoi tradition, while the graves of the Kurma Group do not. The main defining characteristics of the Khotoruk Group are the use of red ochre (full or partial coverage or isolated spots), graves with single and multiple interments, and burials in the flexed body position (supine or on the side). Some later graves of the Khotoruk Group contain grave goods that are morphologically similar to those known from classic EN Kitoi graves (e.g., shanks of composite fishhooks, arrowheads with asymmetrical concave base, harpoons with a perforation at the base, and spoon with flat reservoir). The Kurma Group, on the other hand, is defined by the complete lack of red ochre, graves with only single interments, and the extended supine body position (sometimes with slightly flexed legs). To date, the graves of this group lack any grave goods typical of Kitoi material culture. Based on the available radiocarbon dates, both mortuary groups coexisted roughly at the same time.

To be sure, there are also a few mortuary characteristics shared by these two mortuary groups. These include the generally poor grave good assemblages and its Mesolithic character, the generally northern orientation of the burials, as well as the frequently flexed (to various degrees) body position. The Khotoruk Group displays a few characteristics that make it obviously distinct from the Kitoi mortuary tradition of the Angara and Southwest Baikal: the presence of surface and grave-pit stone structures and flexed burial position. The flexed body position, typifying the Khotoruk Group burials, has been documented also at the Fofanovo cemetery in the Selenga delta, although body orientation there is SE, and in several Kitoi graves at Shamanka II on Southwest Baikal. At both these cemeteries, however, the graves lack stone structures. Interestingly, the most recent radiocarbon dates obtained for the early component of the Fofanovo cemetery show that it significantly pre-dates the beginning of the Kitoi mortuary tradition (White et al., 2020a, 2020b). The chronology of the Fofanovo cemetery generally parallels that of the Khotoruk and Kurma Groups.

Overall, the available archaeological information on the Khotoruk and Kurma mortuary groups is still limited and the distinction proposed in this paper needs to be viewed as exploratory. While it is still too early for a detailed and conclusive assessment of the various culture-historical processes affecting hunter-gatherers of this period in the Little Sea

Table 5
Comparison of Bayesian chronologies for the Other mortuary tradition of the Little Sea micro-region and the main Kitoi cemeteries of the Angara Valley and Southwest Baikal (after Weber et al., 2021).

	EN Little Sea, n = 15			Kitoi Lokomotiv, $n = 80$			Kitoi Shamanka Phase 1, $n = 103$			Kitoi Shamanka Phase 2, $n = 17$		
Chronological terms	68.2%	95.4%	$\mu \pm \sigma$	68.2%	95.4%	$\mu \pm \sigma$	68.2%	95.4%	$\mu \pm \sigma$	68.2%	95.4%	$\mu \pm \sigma$
Lower Phase Boundary												
Average Start	8283–7978	8452–7871	8154 ± 153	7525–7475	7560–7450	7501 ± 26	7526–7486	7552–7466	7507 ± 21	6837–6756	6905–6741	6811 ± 45
Start	8541–8264	8832–8205	8463 ± 168	7571–7495	7622–7475	7542 ± 39	7580–7501	7636–7490	7555 ± 40	6862–6758	6953–6742	6831 ± 59
End	8239–7482	8388–7366	7846 ± 283	7517–7433	7555–7341	7461 ± 52	7516–7435	7540–7350	7460 ± 48	6815–6744	6890–6718	6792 ± 42
Transition	0–1010	0–1199	617 ± 351	0–103	0–243	82 ± 76	0–121	0–260	95 ± 78	0–47	0–160	40 ± 51
Upper Phase Boundary												
Average End	7390–7210	7465–7056	7277 ± 103	7141–7056	7194–7011	7101 ± 44	7251–7188	7290–7168	7224 ± 31	6767–6683	6785–6621	6711 ± 45
Start	7531–7250	7756–7113	7413 ± 158	7268–7058	7429–7035	7199 ± 110	7376–7192	7452–7178	7297 ± 80	6780–6703	6803–6635	6731 ± 42
End	7315–7064	7386–6831	7141 ± 156	7101–6953	7125–6863	7004 ± 73	7201–7120	7225–7073	7152 ± 41	6766–6660	6785–6568	6691 ± 61
Transition	0–346	0–745	272 ± 236	0–308	0–506	194 ± 166	0–264	0–340	145 ± 111	0–47	0–164	40 ± 53
Span of Phase	874–1069	800–1159	974 ± 94	398–537	358–615	480 ± 67	307–401	278–458	363 ± 47	0–138	0–252	104 ± 78

Notes: All dates are BP modelled highest posterior distribution (HPD).

microregion, a separate study provides some initial thoughts on the matter (Weber, 2020). The recently revealed differences and similarities in mortuary protocols reviewed in this paper suggest new dimensions of variation that were previously unknown for this area. It seems that while on the Angara and Southwest Baikal the Kitoi cultural pattern was going through a period of rather dynamic cultural developments, the Little Sea microregion was not much affected by these processes and experienced quite a different trajectory (Weber, 2020). The evidence suggests a fusion of a few typical Kitoi mortuary characteristics with those of local origin. Symptomatically, not a single EN grave in the Little Sea microregion displays a complete package of classic Kitoi mortuary characteristics. Future research will need to focus on the identification of new cemeteries, their excavation and examination of the generated materials. Employing a range of traditional archaeological methods as well as continued dating and application of other scientific laboratory techniques will help establish a firmer understanding of variation in EN hunter-gatherer mortuary practices in the Little Sea microregion within the wider chronological and cultural context of the entire Cis-Baikal.

Acknowledgments

The research reported in this paper has been conducted under a grant from the Government of the Russian Federation, project № 074-02-2018-334 "Baikal Siberia in the Stone Age: At the crossroads of the worlds" and supported by grants for the Baikal Archaeology Project and Baikal-Hokkaido Archaeology Project from the Social Sciences and Humanities Research Council of Canada: Major Collaborative Research Initiative grant Nos. 410-2000-1000, 412-2005-1004, and 412-2011-1001; and Partnership Grant No. 895-2018-1004.

Author contributions

Olga I. Goriunova: conceptualization; methodology; investigation; writing (original draft); resources; funding acquisition.

Aleksei G. Novikov: conceptualization; investigation; writing (original draft); visualization.

Genadii V. Turkin: resources; writing (review, editing).

Andrzej W. Weber: methodology; investigation; software formal analysis; writing (translation, revisions, editing); visualization; funding acquisition.

Competing Interests statement

The authors have no competing interests.

References

Aseev, I.V., 2003. Iugo-Vostochnaia Sibiri' v epokhu kamnia i metalla. Izdatel'stvo Instituta Arkheologii i Etnografii, Sibirskoe otdelenie, Rossiiskaia akademiia nauk, Novosibirsk [In Russian].

Bazaliiskii, V.I., 2010. Mesolithic and Neolithic mortuary complexes in the Baikal region of Siberia. In: Weber, A.W., Katzenberg, M.A., Schurr, T. (Eds.), Prehistoric Hunter–Gatherers of the Baikal Region, Siberia: Bioarchaeological Studies of Past Lifeways. University of Pennsylvania Press, Philadelphia, pp. 51–86.

Bazaliiskii, V.I., 2012. Pogrebal'nye kompleksy epokhi pozdnego mezolita–neolita Baikal'skoi Sibiri: traditsii pogrebenii, absoliutnyi vozrast. Izvestiia laboratorii drevnikh tekhnologii 9, 43–101 [In Russian].

Bazaliiskiy, V.I., Savelyev, N.A., 2003. The wolf of Baikal: The "Lokomotiv" early Neolithic cemetery in Siberia (Russia). Antiquity 77, 20–30.

Berdnikov, I.M., 2013. Kliuchevye aspekty istoriko-kul'turnykh processov na iuge Srednei Sibiri. *Izvestiia Irkutskogo gosudarstvennogo universiteta*. Seriia: Geoarkheologiia. Etnologiia. Antropologiia 1 (2), 203–229 [In Russian].

Bronk Ramsey, C., Schulting, R.J., Bazaliiskii, V.I., Goriunova, O.I., Weber, A.W., 2021. Spatio-temporal patterns of cemetery use among Middle Holocene hunter-gatherers of Cis-Baikal, Eastern Siberia. Archaeol. Res. Asia 25. https://doi.org/10.1016/j.ara.2020.100253.

Gerasimov, M.M., Chernykh, E.N., 1975. Raskopki fofanovskogo mogil'nika v 1959 g. In: Mandel'shtam, A.M. (Ed.), Pervobytnaia arkheologiia Sibiri. Nauka, Leningrad, pp. 23–48 [In Russian].

Goriunova, O.I., 1997. Serovskie pogrebeniia Priol'khon'ia (oz. Baikal). Novosibirsk: Izdatel'stvo Instituta Arkheologii i Etnografii, Sibirskoe otdelenie, Rossiiskaia akademiia nauk [In Russian].

Goriunova, O.I., Khlobystin, L.P., 1992. Datirovka kompleksov poseleniia i pogrebenii bukhty Ulan-Khada. *Drevnosti Baikala*. In: Masson, V.M. (Ed.), Izdatel'stvo Irkutskogo gosudarstvennogo universiteta, Irkutsk, pp. 41–56 [In Russian].

Goriunova, O.I., Novikov, A.G., 2017. Keramika rannego neolita iz poselenii poberezh'ia ozera Baikal. In: Trudy V (XXI) Vserosiiskogo arkheologicheskogo sezda v Barnaule–Belokurikhe, Vol. 1. Izdatel'stvo Altaiskogo universiteta, Barnaul, pp. 137–140 [In Russian].

Goriunova, O.I., Weber, A.W., 2003. Raboty Rossiisko-Kanadskoi ekspeditsii na mogil'nikakh bronzovogo veka poberezhiia oz. Baikal. Problemy arkheologii, etnographii, antropologii Sibiri i sopredel'nyh territorii 9 (1), 331–335 [In Russian].

Goriunova, O.I., Novikov, A.G., Weber, A.W., 2011. Keramika rannego neolita Pribaikal'ia (po materialam mnogosloinogo poseleniia Sagan-Zaba II). In: Trudy III (XIX) Vserosiiskogo arkheologicheskogo sezda. Sankt Peterburg, Velikii Novgorod: IIMK RAN, 1, pp. 125–127 [In Russian].

Goriunova, O.I., Weber, A.V., Novikov, A.G., 2012. Pogrebal'nye kompleksy neolita i bronzovogo veka Priol'khon'ia: Mogil'nik Kurma XI. Izdatel'stvo Irkutskogo gosudarstvennogo universiteta, Irkutsk [In Russian].

Goriunova, O.I., Novikov, A.G., Weber, A.W., 2020. Middle Holocene hunter–gatherer mortuary practices in the Little Sea micro-region on Lake Baikal, Part II: Late Neolithic. Archaeol. Res. Asia (Submitted).

Griaznov, M.P., Maksimenkov, G.A., 1992. Zadachi i itogi rabot Irkutskoi ekspeditsii. In: Baikala, Drevnosti, Masson, V.M. (Eds.), Izdatel'stvo Irkutskogo gosudarstvennogo universiteta, Irkutsk, pp. 5–13 [In Russian].

Kharinskii, A.V., Lun'kov, A.V., 2010. Otchet o nauchno-issledovatel'skoi rabote: Spasatel'nye arkheologicheskie raboty na pogrebal'no-pominal'nom komplekse Khuzhir-Nuge IX v Ol'khonskom raione v 2010 g. Arkhiv Tsentra sokhraneniia naslediia Irkutskoj oblasti. No. N№ 1408/и, Irkutsk [In Russian].

Kichigin, D.E., 2014. Neoliticheskoe pogrebenie na myse Uiuga (oz. Baikal). Drevnie kul'tury Mongolii i Baikal'skoi Sibiri 1, 93–97 [In Russian].

Kichigin, D.E., Emel'ianova, IuA, Korostelev, A.M., 2017. Parnoe pogrebenie rannego bronzovogo veka mogil'nika Mys Uiuga (predvaritel'NOE soobshchenie). In: Drevnie kul'tury Mongolii, Baikal'skoi Sibiri i severnogo Kitaia. Chanchun, pp. 102–107 [In Russian].

Kobe, F., Bezrukova, E.V., Leipe, C., Shchetnikov, A.A., Goslar, T., Wagner, M., Tarasov, P.E., 2020. Holocene vegetation and climate history in Baikal Siberia reconstructed from pollen records and its implications for archaeology. Archaeol. Res. Asia 23. https://doi.org/10.1016/j.ara.2020.100209.

Komarova, N.V., Sher, IaA., 1991. Mogil'niki bukhty Ulan-Khada. In: Baikala, Drevnosti, Masson, V.M. (Eds.), Izdatel'stvo Irkutskogo gosudarstvennogo universiteta, Irkutsk, pp. 41–56 [In Russian].

Konopatskii, A.K., 1982. Drevnie kul'tury Baikala (o. Ol'khon). Nauka, Novosibirsk [In Russian].

Losey, R.J., Bazaliiskii, V.I., Garvie-Lok, S., Germonpré, M., Leonard, J.A., Allen, A.L., Katzenberg, M.A., Sablin, M.V., 2011. Canids as persons: Early Neolithic dog and wolf burials, Cis-Baikal, Siberia. J. Anthropol. Archaeol. 30, 174–189.

Losey, R.J., Fleming, L., Nomokonova, T., Bazaliiskii, V.I., Klement'ev, A.M., Savel'ev, N. A., 2017. Angara-Southwest Baikal. In: Losey, R.J., Nomokonova, Y. (Eds.), Holocene Zooarchaeology of Cis-Baikal, Siberia. German Archaeological Institute. Verlag Philipp von Zabern, Darmstadt, pp. 27–52.

Mamonova, N.N., Sulerzhitskii, L.D., 1989. Opyt datirovaniya po 14C pogrebenii Pribaikal'ia epokhi golotsena. Sovetskaia arkheologiia 1, 19–32 [In Russian].

McKenzie, H.G., 2009. Review of early hunter–gatherer pottery in Eastern Siberia. In: Jordan, P., Zvelebil, M. (Eds.), Ceramics before farming: The dispersal of pottery among prehistoric Eurasian hunter–gatherers. Left Coast Press, Walnut Creek, CA, pp. 167–208.

Nomokonova, Tyu, Losey, R.J., Goriunova, O.I., Weber, A.W., 2013. A freshwater old carbon offset in Lake Baikal, Siberia, and problems with the radiocarbon dating of archaeological sediments: Evidence from the Sagan-Zaba II site. Quat. Int. 290–291, 110–125.

Novikov, A.G., Goriunova, O.I., 2012. Neoliticheskie pogrebeniia Priol'khon'ia (oz. Baikal): perdiodizatsiia i khronologiia. Drevnie kul'tury Mongolii i Baikal'skoi Sibiri 3 (1), 80–89 [In Russian].

Novikov, A.G., Goriunova, O.I., 2016. Skul'ptura malykh form iz poselenii neolita i bronzovogo veka poberezh'ia ozera Baikal. Arkheologiia, etnografiia i antropologiia Evrazii 44 (4), 60–66 [In Russian].

Okladnikov, A.P., 1950. Neolit i bronzovyi vek Pribaikal'ia (chast' I i II). Materialy i issledovaniia po arkheologii SSSR, Vol. 18. Izdatel'stvo Akademii nauk SSSR, Moscow [In Russian].

Savel'ev, N.A., 1989. Neolit iuga srednei Sibiri, istoriia osnovnykh idei i sovremennoe sostoianie problemy. In: PhD summary. Novosibirsk. Institut historii, filosofii i filologii, SO SSSR Akedemii nauk.

Savel'ev, N.A., Teten'kin, A.V., Igumnova, E.S., Abdulov, T.A., Ineshin, E.M., Osadchii, S. S., Vetrov, V.M., Klement'ev, A.M., Mamontov, M.P., Orlova, L.A., Shibanova, I.V., 2001. Mnogosloinyi geoarkheologicheskii obekt Ust'-Khaita—predvaritel'nye dannye. In: Derevianko, A.P., Medvedev, G.I. (Eds.), Sovremennye problemy Evraziiskogo paleolitovedeniia, pp. 338–347. Izdatel'stvo Instituta Arkheologii i Etnografii, Sibirskoe otdelenie, Rossiiskaia akademiia nauk. [In Russian].

Schulting, R.J., Bronk Ramsey, C., Scharlotta, I., Richards, M., Weber, A.W., 2020. Freshwater reservoir effects in Cis-Baikal: an overview. Archaeol. Res. Asia (Submitted).

Studzitskaia, S.V., 1976. Sootnoshenie proizvodstvennykh i kul'tovykh funktsii sibirskikh neoliticheskikh izobrazhenii ryb. Iz istorii Sibiri 21, 74–89 [In Russian].

Tarasov, P.E., Bezrukova, E.V., Müller, S., Kostrova, S.S., White, D., 2017. Climate and vegetation history. In: Losey, R.J., Nomokonova, T. (Eds.), Holocene Zooarchaeology of Cis-Baikal. Archaeology in China and East Asia, 6. Nünnerich–Asmus Verlag & Media GmbH, Mainz (DE), pp. 15–26.

Timoshchenko, A.A., Bocharova, E.N., 2016. Predvaritel'nye rezul'taty izucheniia mnogosloinogo arkheologicheskogo obekta Bugul'deika I na iugo-zapadnom poberezh'e oz. Baikal w 2016 g. Evraziia v kainozoe. Stratigrafiia, peleoekologiia, kul'tury 5, 180–187 [In Russian].

Weber, A.W., 2003. Bio-geographic profile of the Lake Baikal region, Siberia. In: Weber, A.W., McKenzie, H.G. (Eds.), Prehistoric Foragers of the Cis-Baikal, Siberia. Proceedings of the First Conference of the Baikal Archaeology Project. Canadian Circumpolar Institute Press, Edmonton (AB), pp. 51–66.

Weber, A.W., 2020. Middle Holocene hunter–gatherers of Cis-Baikal, Eastern Siberia: combined impacts of the boreal forest, bow-and-arrow, and fishing. Archaeol. Res. Asia 24. https://doi.org/10.1016/j.ara.2020.100222.

Weber, A.W., Bettinger, R.L., 2010. Middle Holocene hunter–gatherers of Cis-Baikal, Siberia: An overview for the new century. J. Anthropol. Archaeol. 29, 491–506.

Weber, A.W., Goriunova, O.I., 2005. Khronologiia mogil'nika Kurma XI (oz. Baikal) po arkheologicheskim i radiouglerodnym dannym. Izvestiia Laboratorii drevnikh tekhnologii Irkutskogo gosudarstvennogo tekhnicheskogo universiteta 3, 186–190 [In Russian].

Weber, A.W., Link, D.W., Katzenberg, M.A., 2002. Hunter–gatherer culture change and continuity in the Middle Holocene Cis-Baikal, Siberia. J. Anthropol. Archaeol. 21, 230–299.

Weber, A.W., Beukens, R., Bazaliiskii, V.I., Goriunova, O.I., Savel'ev, N.A., 2006. Radiocarbon dates from Neolithic and Bronze Age hunter–gatherer cemeteries in the Cis-Baikal region of Siberia. Radiocarbon 48 (1), 127–166.

Weber, A.W., Goriunova, O.I., McKenzie, H.G. (Eds.), 2008. KHUZHIR-NUGE XIV, a Middle Holocene Hunter–gatherer Cemetery on Lake Baikal, Siberia: Archaeological Materials. Northern Hunter–gatherers Research Series, Vol. 4. Canadian Circumpolar Institute Press, University of Alberta, Edmonton.

Weber, A.W., White, D., Bazaliiskii, V.I., Goriunova, O.I., Savel'ev, N.A., Katzenberg, M. A., 2011. Hunter–gatherer foraging ranges, migrations, and travel in the middle Holocene Baikal region of Siberia: insights from carbon and nitrogen stable isotope signatures. J. Anthropol. Archaeol. 30 (4), 523–548.

Weber, A.W., Goriunova, O.I., McKenzie, H.G., Lieverse, A.R. (Eds.), 2012. Kurma XI, a Middle Holocene hunter–gatherer cemetery on Lake Baikal, Siberia: Archaeological and Osteological Materials. Archaeology in China and East Asia Vol. 3, German Archaeological Institute, Berlin and Northern Hunter–gatherers Research Series Northern Hunter–gatherers Research Series, 6. Canadian Circumpolar Institute Press, University of Alberta, Edmonton.

Weber, A.W., Schulting, R.J., Bronk Ramsey, C., Goriunova, O.I., Bazaliiskii, V.I., Berdnikova, N.E., 2016. Chronology of middle Holocene hunter–gatherers in the Cis-Baikal region of Siberia: Corrections based on examination of the freshwater reservoir effect. Quat. Int. 419, 74–98. Part C.

Weber, A.W., Bronk Ramsey, C., Schulting, R.J., Bazaliiskii, V.I., Goriunova, O.I., 2021. Middle Holocene hunter–gatherers of Cis-Baikal, Eastern Siberia: Chronology and dietary trends. Archaeol. Res. Asia 25. https://doi.org/10.1016/j.ara.2020.100234.

White, J.A., Schulting, R.J., Hommel, P., Lythe, A., Bronk Ramsey, C., Moiseyev, V., Khartanovich, V., Weber, A.W., 2020a. Integrated stable isotopic and radiocarbon analyses of Neolithic and Bronze Age hunter–gatherers from Lake Baikal's Little Sea and Upper Lena River micro-regions. J. Archaeol. Sci. https://doi.org/10.1016/j.jas.2020.105161.

White, J.A., Schulting, R.J., Hommel, P., Moiseyev, V., Khartanovich, V., Bronk Ramsey, C., Weber, A.W., 2020b. Turning eastward: New radiocarbon and stable isotopic data for Middle Holocene hunter-gatherers from Fofanovo, Trans-Baikal, Siberia. Archaeol. Res. Asia (Submitted).