



Full length article

Middle Holocene hunter–gatherer mortuary practices in the Little Sea microregion on Lake Baikal, part II: Late Neolithic

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1. Introduction

This is the second 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 first study, appearing also in this special issue, reviewed the Early Neolithic (EN) mortuary material (Goriunova et al., 2020), whereas the goal of this paper is to summarize the available archaeological material referred to as the Serovo mortuary tradition of the Little Sea area (henceforth, the Little Sea–Serovo). The focus will be on the identification of its defining characteristics, comparison with other Serovo microregional groups, assessment of its chronological parameters as well as comparison with the EN mortuary protocol.

2. Materials

The Serovo mortuary tradition of Cis-Baikal, as originally defined by A.P. Okladnikov (1950), is currently represented by nine localities in the Little Sea microregion (Novikov and Goriunova, 2012). In the Okladnikov culture-history, Serovo belonged to the Middle Neolithic (MN) while in the revised model, based mostly on radiocarbon dating, its chronological position is firmly Late Neolithic (LN) (Weber et al., 2016).

Table 1

Summary of the current culture history and its chronological boundaries for the Middle Holocene Cis-Baikal region (after Weber et al., 2020).

Period	Mortuary traditions	HPD Cal. BP ^a
Late Mesolithic	Khin	8630–7560
Early Neolithic	Kitoi & Khin	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 dates.

The first Serovo materials in the Little Sea were discovered in 1959 by the teams of the Irkutsk Expedition from the Leningrad Branch of the Institute of Archaeology (USSR Academy of Sciences), which documented 5 graves: 4 excavated by L.P. Ziablin at Uliarba III and 1 by N.K. Kachalova and S.S. Chernikov on the Elga Mys (cape) of Ol'khon Island (Goriunova et al., 2004; Novikov, Goriunova 2012). During the mid-1970s, the Complex North Asian Archaeological Expedition (Siberian Branch, USSR Academy of Sciences), led by A.P. Okladnikov, found 2 Serovo graves at the Shamanskii Mys cemetery (Konopatskii, 1982: 49–54). One Serovo grave was excavated in 1978 by V.V. Svinin (the Ol'khon team of the Complex Archaeological Expedition from the Irkutsk State University) at Kharansa I on Ol'khon Island (Bazaliiskii, 1979). The fieldwork conducted at Uliarba II in 1983 by the Angara–Baikal team from the Irkutsk Natural History Museum, led by V.I. Smotrova, revealed 2 more graves associated with Serovo (Goriunova et al., 2004). Additionally, 2 Serovo graves were discovered in 1986 at Budun IV by a team from the Institute of Social Sciences (Buriat Division, Siberian Branch, USSR Academy of Sciences), led by B.B. Dashibalov (1987: 105–106).

Fieldwork conducted by the Little Sea team of the Complex Archaeological Expedition (Irkutsk State University) between 1984 and 1988 generated a large body of Serovo materials from the entire Cis-Baikal and, specifically, from the Little Sea microregion (Goriunova, 1997). This work documented 22 graves from 5 cemeteries: Sarminskii Mys (1986–1987 excavations), Khuzhir-Nuge VI (1987), Khalurinskii Mys I (1984–1985), Shrakshura II (1988), and Elga III (1988). In 2005, the fieldwork was continued by a team from the Irkutsk Laboratory of Archaeology and Paleoecology (Institute of Archaeology and Ethnography, Siberian Branch, Russian Academy of Sciences) led by O.I. Goriunova, which discovered 2 additional Serovo graves at Khuzhir-Nuge VI (Goriunova and Batrakova, 2005). Recently, the number of Serovo burials increased again due to the efforts of the Russian–Canadian Expedition from Irkutsk State University, MacEwan University, and the University of Saskatchewan. In 2015, the team excavated 1 grave containing 7 individuals at Budun IV (Novikov et al., 2015).

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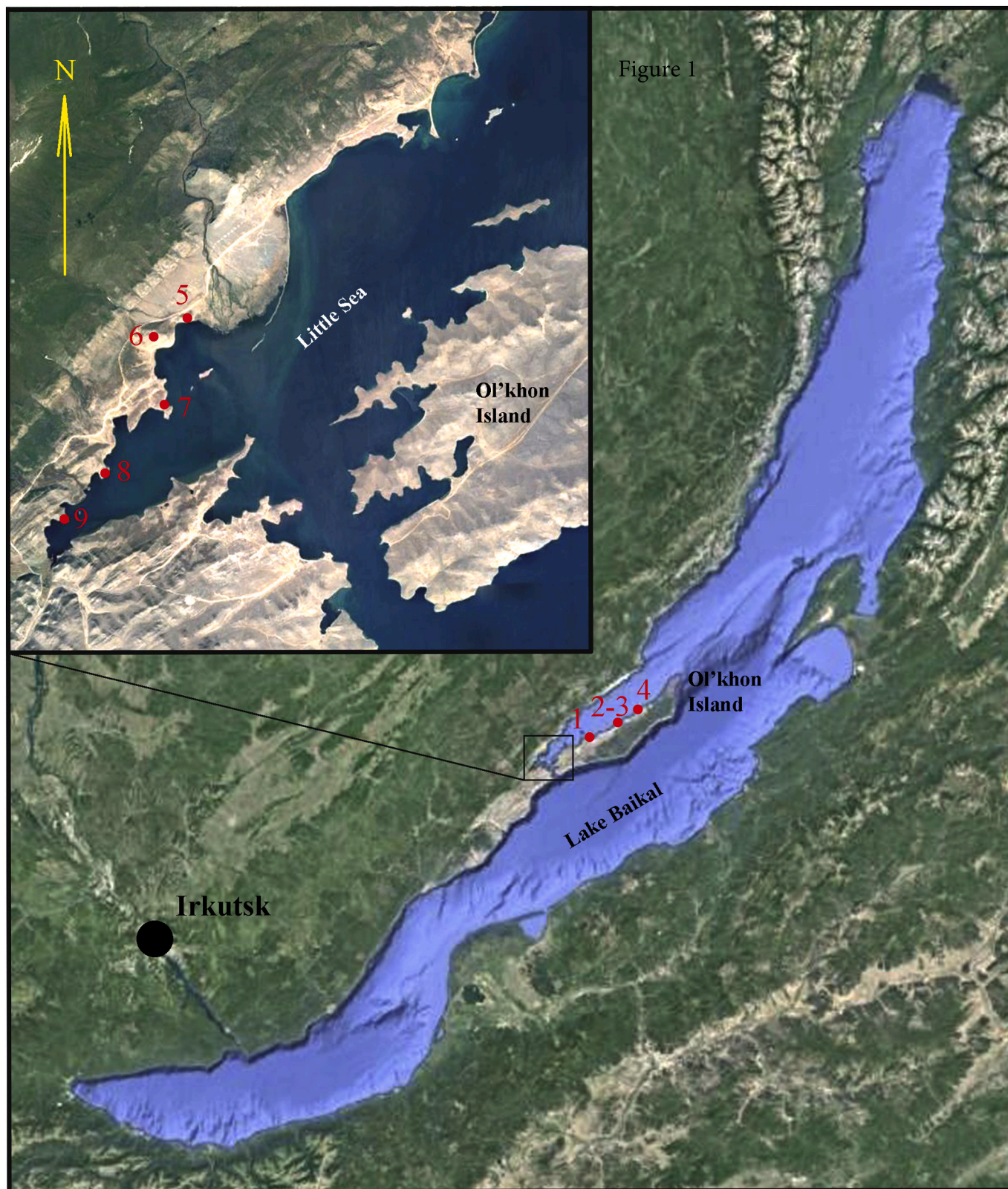


Fig. 1. Location of Late Neolithic Serovo cemeteries within the Little Sea microregion: 1–Elga III; 2–Shamanskii Mys I; 3–Kharansa I; 4–Budun IV; 5–Sarminskii Mys; 6–Khuzhir-Nuge VI; 7 –Uliarba; 8–Shrakshura II; 9–Khalurinskii Mys I.

As of today, there are a total of 39 documented Serovo graves (Fig. 1, Tables 2 and 3) from 9 localities (some cemeteries, some isolated graves) in the Little Sea microregion. Keep in mind, however, that in most cases at the time these graves were first published, their culture historical classification was entirely based on typological criteria. Since

EN mortuary variation in the Little Sea and its similarities with the Little Sea–Serovo were not yet fully appreciated, typological dating risked confusing EN with LN. Although recent radiocarbon dating confirmed the LN age of most of these graves, it also demonstrated the EN age of several graves originally believed to be LN. Thus, it is still

Table 2
Summary of main Late Neolithic Serovo mortuary characteristics in the Little Sea microregion.

No.	Cemetery	Grave	Burial	Master ID	Age	Sex	Extensively disturbed grave	Surface stone structures	Gravepit stone structures	Birch bark cover	Single burial	Double burial stacked	Group burial stacked	Primary burial	Secondary burial	Unknown	Extended supine	Supine w. flexed legs	On side legs flexed	Head pointing NW	Head pointing NNE	Pit-fires	Full coverage by ochre	Spots of red ochre	No ochre	Lithic grave goods	Bone/antler grave goods	Ceramic pots	Grave goods absent	Faunal remains	Notes			
1	Elga III	Gr. 4-1959	B. 1	EL3_1959.004	?	U	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+					
		Gr. 1	B. 1	EL3_1988.001	5+y.	U	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+				
		Gr. 2	B. 1	EL3_1988.002	?	U	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+				
		Gr. 3	B. 1	EL3_1988.003	14-19 y.	U	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+				
		Gr. 4	B. 1	EL3_1988.004	20-35 y.	M	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+				
2	Shamanskii Mys I	Gr. 3-1975	cairn and/or pit	EL3_1988.005	20-35 y.	FP	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+					
		B. 1	B. 1	SHM_1975.003.01	?	U	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+				
		B. 2	B. 2	SHM_1975.003.02	?	U	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+			
		Gr. 1-1976	cairn and/or pit	SHM_1976.001.01	20+y.	U	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+			
		B. 2	B. 2	SHM_1976.001.02	?	U	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+			
3	Kharansa I	Gr. 2-1978	cairn and/or pit	SHM_1976.001.03	?	U	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+				
		B. 1	B. 1	KH1_1978.002.01	20-35 y.	F	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	neonate			
		B. 2	B. 2	KH1_1978.002.02	-6-6 m.	U	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+				
4	Budun IV	Gr. 27	cairn and/or pit	BUD_1986.027.01	35-50 y.	MP	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+				
		B. 1	B. 1	BUD_1986.027.01	35-50 y.	MP	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+			
		B. 2	B. 2	BUD_1986.027.02	20+y.	U	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+		
		B. 3	B. 3	BUD_1986.027.03	20+y.	U	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	
		Gr. 28	cairn and/or pit	BUD_1986.028.01	20+y.	FP	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+		
		B. 1	B. 1	BUD_1986.028.01	20+y.	FP	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+		
		B. 2	B. 2	BUD_1986.028.02	20+y.	FP	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+		
		Gr. 1-2015	cairn and/or pit	BUD_2015.001	40-45 y.	MP	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+		
		B. 1	B. 1	BUD_2015.001	40-45 y.	MP	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	
		B. 2	B. 2	BUD_2015.002	13-16 y.	U	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	
		B. 3	B. 3	BUD_2015.003	20-30 y.	U	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	
		B. 4	B. 4	BUD_2015.004	16-17 y.	U	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	
		B. 5	B. 5	BUD_2015.005	20+y.	FP	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	
B. 6	B. 6	BUD_2015.006	45-50 y.	FP	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+			
B. 7	B. 7	BUD_2015.007	9-15 m.	U	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+			
5	Sarminskii Mys	Gr. 1	B. 1	SMS_1986.001	?	U	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+				
		Gr. 6	B. 1	SMS_1986.006	?	U	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+			
		Gr. 8	B. 1	SMS_1986.008	?	U	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+		
		Gr. 11A	cairn and/or pit	SMS_1986.011A.01	8-13 y.	U	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+		
		B. 1	B. 1	SMS_1986.011A.01	8-13 y.	U	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	
		B. 2	B. 2	SMS_1986.011A.02	20-35 y.	M	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	
		B. 3	B. 3	SMS_1986.011A.03	0-7 y.	U	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	
		B. 4	B. 4	SMS_1986.011A.04	20-35 y.	MP	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	
		B. 5	B. 5	SMS_1986.011A.05	36-55 y.	F	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	
		Gr. 11B	B. 1	SMS_1986.011B.01	20-35 y.	M	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	
		Gr. 17	B. 1	SMS_1986.017	20-35 y.	M	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	
		Gr. 19	cairn and/or pit	SMS_1986.019.01	14-19 y.	M	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	
		B. 1	B. 1	SMS_1986.019.01	14-19 y.	M	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	
B. 2	B. 2	SMS_1986.019.02	56+y.	M	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+			
B. 3	B. 3	SMS_1986.019.03	20+y.	MP	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+			
B. 4	B. 4	SMS_1986.019.04	20+y.	MP	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+			

(continued on next page)

Table 2 (continued)

No.	Cemetery	Grave	Burial	Master ID	Age	Sex	Extensively disturbed grave	Surface stone structures	Gravestone structures	Birch bark cover	Single burial	Double burial stacked	Group burial stacked	Primary burial	Secondary burial	Unknown	Extended supine	Supine w. flexed legs	On side legs flexed	Head pointing NW	Head pointing NNE	Pit-fires	Full coverage by ochre	Spots of red ochre	No ochre	Lithic grave goods	Bone/antler grave goods	Ceramic pots	Grave goods absent	Faunal remains	Notes									
6	Khuzhir-Nuge VI	Gr. 23	B. 5	SMS_1986.019.05	36-55 y.	F																																		
			B. 1	SMS_1987.023	?	U																																		
		Gr. 29	cairn and/or pit																																					
			B. 1	SMS_1987.029.01	20+ y.	M																																		
		Gr. 30A	B. 2	SMS_1987.029.02	8-13 y.	U																																		
			B. 3	SMS_1987.029.03	20+ y.	M																																		
			B. 1	SMS_1987.030A.01	?	U																																		
		Gr. 30B	cairn and/or pit																																					
			B. 1	SMS_1987.030B.01	20-35 y.	U																																		
			B. 2	SMS_1987.030B.02	0-7 y.	U																																		
Gr. 31	cairn and/or pit																																							
	B. 1	SMS_1987.031.01	30-40 y.	M																																				
	B. 2	SMS_1987.031.02	36-55 y.	M																																				
Gr. 3	B. 3	SMS_1987.031.03	20-35 y.	FP																																				
	B. 1	KN6_1987.001	20+ y.	MP																																				
	B. 1	KN6_1987.002	15+ y.	U																																				
7	Uliarba	Gr. 26	B. 1	ULB_1959.026	?	U																																		
			B. 1	ULB_1959.027	?	U																																		
		Gr. 27	cairn and/or pit																																					
			B. 1	ULB_1959.028.01	?	U																																		
		Gr. 28	B. 2	ULB_1959.028.02	?	U																																		
			B. 1	ULB_1983.039	14-19 y.	U																																		
		Gr. 39	B. 1	ULB_1983.041	8-13 y.	U																																		
B. 1	SR2_1988.002		?	U																																				
8	Shrakshura II	Gr. 2	B. 1			U																																		
		Gr. 1	B. 1	KMS_1985.001	20+ y.	U																																		
9	Khalurinski Mys I	Gr. 2	B. 1	KMS_1985.002	?	U																																		
		B. 1					U																																	
Totals		39					9	38	19	35	28	3	8	64	3	12	50	0	4	26	30	6	48	0	4	63	37	21	26	29	3									

possible that some graves included in the following account, particularly those that lack diagnostic mortuary characteristics and not yet radiocarbon-dated, may in fact be EN in age. (See Table 1.)

2.1. Elga III

The cemetery is located on the NW coast of Ol'khon Island, on the south facing slope of the Elga Mys. The graves were situated in subtle depressions between bedrock outcrops, 33–38 m above the level of Lake Baikal. Six graves were excavated there: Grave 4 in 1959 and Graves 1–5 in 1988 (Tables 2 and 3). All interments were covered by round or oval stone surface structures measuring about 4.8 × 3.8 m and oriented NNW–SSE. Grave 1 contained rocks inside the pit as well. The pits began about 0.36–0.70 m below the modern surface. All graves contained single burials, most in extended supine position. In three cases, the body position could not be established: in one grave the skeleton had burned up entirely with only some small calcined fragments surviving (Gr. 1) and two were disturbed in the past (Gr. 2 and 4–1988). The heads of the interments were pointing N with some minor inclinations to the E or W. Five of the burials were charred by fires lit in the grave pit (henceforth pit-fires) (Gr. 1–5, all from 1988) and in two of these cases they were also covered by sheets of birch bark (Gr. 1 and 5).

While most graves had at least some grave goods, two had none (Gr. 2 and 4–1988; Table 3). The assemblage of finds consisted of 1 knife with edge retouch along the blade (Gr. 1), 15 arrowheads (9 with symmetrical concave base, 5 tanged, and 1 rhombic [ромбовидный]) and 1 flake (Gr. 3), 1 prismatic blade, 1 bone point (Gr. 4–1959), 1 ground green nephrite adze and a number of red deer canine pendants (Gr. 5). Two graves contained ceramic pots. The pot in Grave 3 was plain-surface¹ and decorated with horizontal rows of punctuated stamps, while the vessel in Grave 4–1959 had net impressions on the surface but no decoration.

2.2. Shamanskii Mys

The cemetery is located on the narrow part of the Shamanskii Mys on the NW coast of Ol'khon Island. Shamanskii Mys is a multi-component cemetery with graves dating to the EN, LN, and Early Bronze Age (EBA), with two representing the Serovo mortuary tradition: Grave 3–1975 and Grave 1–1976 (Tables 2 and 3; Konopatskii, 1982). Spatially, these two graves were located 30–32 m to the NW of the main group of graves and 28–30 m above Lake Baikal. Both graves were partly disturbed in the past and both featured surface stone structures. While only 8 stones survived in Grave 3–1975, the pit of Grave 1–1976 was covered by a few layers of rocks. The latter stone structure was oval with its long axis aligned N–S; it measured 4.8 × 4.0 m. The grave pits began to appear around 0.45 m below the modern surface. Grave 3–1975 contained two burials while Grave 1–1976 had three. In both graves, the burials were arranged on two layers and all were likely interred in extended supine position with their heads pointing N. The two burials of the upper level in Grave 1–1976 were covered with sheets of birch bark. The top levels of both graves also featured evidence suggesting the use of pit-fires. In Grave 1–1976, the grave goods found near the right knee of the lower skeleton were stained by a small patch of red ochre.

The grave goods (Table 3) were dominated by arrowheads: 9 symmetrical with concave base (Fig. 4: 6–7), 2 tanged, and 1 with straight base. Together, the graves also contained 3 bifacial knives, 2 ground-stone knives and 3 green nephrite groundstone adzes, several flakes, 3

bone shafts for composite tools, 5 bone points, and 2 round-bottom ceramic pots of 'complex' 'closed' form.² The plain-surface pot in Grave 3–1975 had two applique bars with denticulate stamps below the rim, while and the rest of the body was decorated with horizontal rows of punctuated stamps forming intersecting pairs of hanging double lines in the shape of an "×". The pot from the lower burial layer in Grave 1–1976 had net-impressions on the surface but no decoration.

Grave 3–1975 contained 1 whitefish-shaped fish-lure made of marble (Fig. 5: 8), a composite tool with 6 bifaces still in the groove of the bone shaft, 1 prismatic blade, 1 bone awl, and 1 fragment of a bone object. Grave 1–1976 had 1 scraper, 1 awl made of green nephrite, 1 pebble-flaker, 1 bone barb for a composite fishhook, 5 bone blades together totaling 30 cm in length (bow stiffeners; count of 1 in Table 3), several red deer canine pendants, 1 ornament made of a longitudinally split boar tusk, 1 flat bone bead, and a large number of tube beads.

2.3. Kharansa I

The cemetery is located in the SW part of the Buluk Cove (NW coast of Ol'khon Island) within the spatial boundaries of a large graveyard dating to the Medieval period. One of the excavated graves (Grave 2–1978) was classified as Serovo (Tables 2 and 3; Bazaliiskii, 1979). A human burial was discovered below an oval-shaped stone structure that was found about 0.20 m below the modern surface. The stone structure, measuring 3.8 × 2.4 m, began 0.40 m below the surface and was aligned NS. The grave contained the burial of a woman with an infant, probably unborn. The female skeleton was extended and supine with the head pointing NNW. It was covered by sheets of birch bark and affected by a pit-fire. A small ochre stain was documented around the pelvis. Grave goods included 2 ground nephrite knives, 1 knife with edge retouch along the blade, 1 scraper, 1 angle-burin, 1 flake, and 1 plain-surface pot with round bottom with the rim decorated with diagonal incisions. Bone objects included 1 bone arrowhead, 1 simple fishhook, 1 needle box, 2 needles, 1 blade (bow stiffener?), and 2 red deer canine pendants (Table 3).

2.4. Budun IV

The cemetery is located on the SW part of the Budun Mys, 95–97 m above the lake level, on the NW coast of Ol'khon Island. Three Serovo graves were excavated there: Graves 27 and 28 in 1986 and Grave 1 in 2015 (Tables 2 and 3; Dashibalov, 1987; Novikov et al., 2015). All burials were placed underneath surface stone structures, measuring 4.8 × 3.8 m and aligned NS. The grave pits began 0.45 m below the modern surface. Grave 27 had three interments, Grave 28 had two, and Grave 1–2015 had seven burials, all arranged on two or three levels. Eight burials were extended supine and four (three in Gr. 27 and one in Gr. 1–2015) were placed on their side with flexed legs (Fig. 2: 3). The heads all pointed N with minor deviations. The upper level of all three graves was covered with sheets of birch bark and showed evidence of fire and the human bones were charred.

The assemblage of grave goods from Grave 1–2015 consisted of 1 slate and 1 ground nephrite knife, 2 burbot-shaped fish-lures, 2 ground green nephrite adzes, 1 prismatic blade, 1 bone point, and 3 red deer canine pendants. Grave 27 had 1 ground nephrite knife and 2 plain-surface pots with round bottoms, one of which was decorated with horizontal rows of punctuated stamps while the other had no decoration. Grave 28 had no grave goods (Table 3).

¹ In the Cis-Baikal region, Neolithic pottery features three different kinds of surface treatment: (1) net-impressions; (2) cord-impressions; and (3) plain-surface. All three can be further decorated with a variety of techniques and motifs.

² Vessels of the 'closed' form have the greatest diameter below the rim; 'open' forms have the greatest diameter at the rim; 'complex' forms have weakly everted rims and weakly defined neck; 'simple' forms lack separate rim and have no neck (McKenzie, 2009).

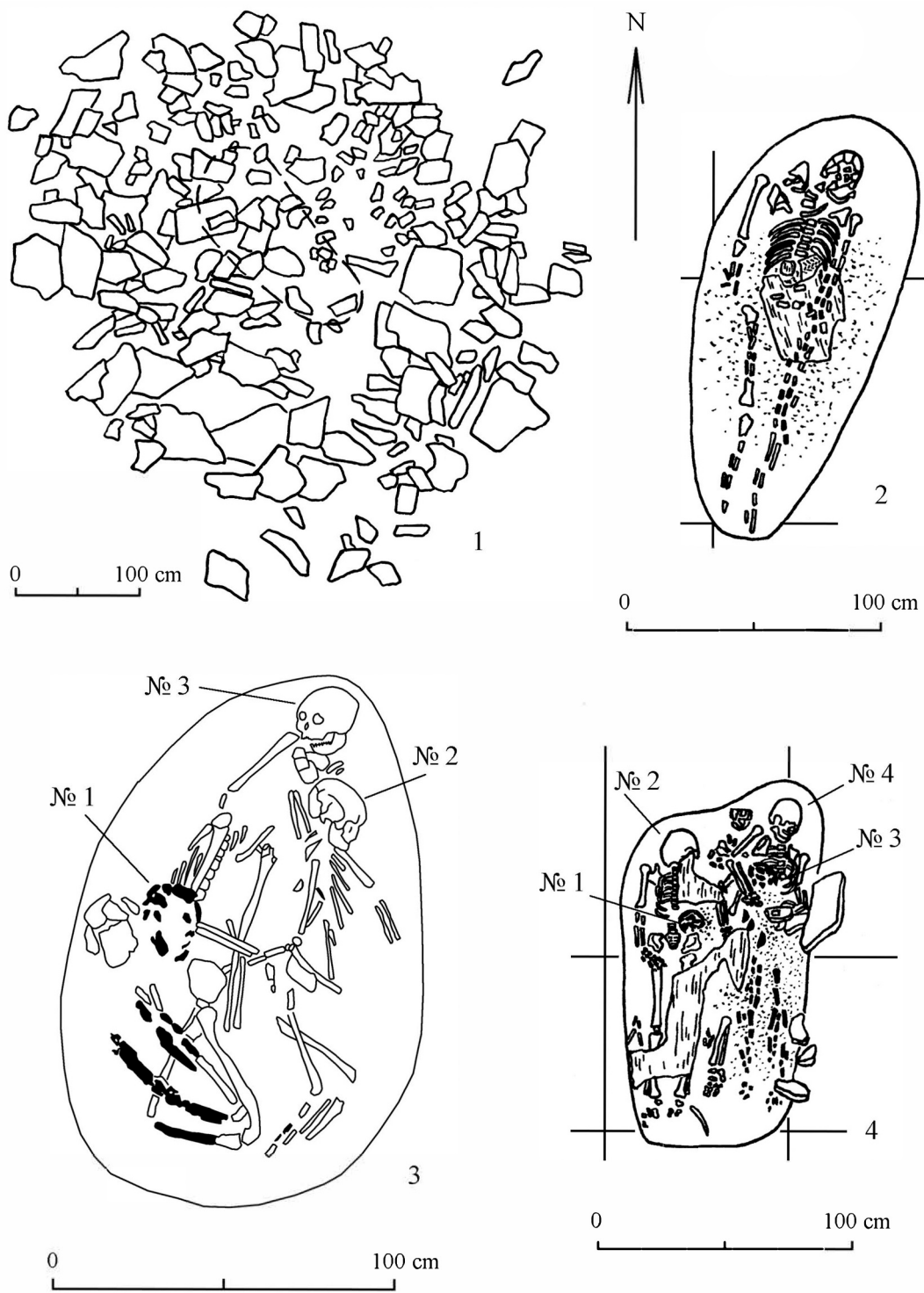


Fig. 2. Examples of Late Neolithic Serovo graves in the Little Sea microregion: 1–surface stone structure, Uliarba, Grave 26; 2–grave with a single burial, Sarminskii Mys, Grave 17; 3–grave with multiple burials, Budun IV, Grave 27; 4–grave with multiple burials, Sarminskii Mys, Grave 19.

2.5. Sarminskii Mys

The cemetery is located on the S-facing slope of the Sarminskii Mys on the NW coast of the Little Sea mainland (Goriunova, 1997). It is another multicomponent cemetery with graves dating to the EN, LN, and EBA. Three graves, previously believed to be Serovo, have now been identified by radiocarbon dating as belonging to the EN (Goriunova et al., 2020), leaving 12 graves (i.e., counting Gr. 11 and 30

as each consisting of two) classified as Serovo (Tables 2 and 3). These were built on the slope between 26 and 52 m above the lake. Graves 11(A&B), 17, 19, 29, 30(A&B), and 31) were arranged parallel to one another forming a row running SW–NE. Five of these (Gr. 11A, 19, 29, 30B, and 31) had more than one burial arranged vertically. All interments were placed underneath oval surface structures consisting of a few layers of rocks and measuring 2.1–3.7 × 3.5–5.0 m. Stone slabs smaller than those used for the surface structures were placed inside

most of the graves. Graves 30A and 30B were two separate pits arranged side-by-side, each filled with stones and covered by one large stone structure. Grave 30A contained one burial and Grave 30B had three placed one on top of the other. The grave pits were oval and began 0.30–0.68 m below the modern surface. Graves 11A and 11B consisted of two separate pits arranged vertically: the upper Grave 11A with 5 burials was separated from the burial in the lower Grave 11B by a layer of stones. Graves 1 and 11A had stone slabs set vertically at the head-end of the pit. The bottoms of two graves (Gr. 1 and 6) were lined with stones.

Seven graves contained 1 burial (Fig. 2: 2) and 5 had anywhere from 2 to 6 interments (Fig. 2: 4), the latter group accounting for a total of 20 individuals (Table 2). The skeletons in graves with multiple burials were typically arranged in two or three layers. A pattern was observed whereby adult individuals were placed at the bottom of the graves while the children were interred at the higher levels. There were no graves with separate burials of children younger than 13 years.

All primary burials were placed in extended supine position with the head pointing N or NW. Three interments appeared to be secondary. Grave 31 contained a primary burial and a pile of bones representing two other individuals placed on top of its legs. Since some of these bones were still articulated, it seems that they were interred partially excarnated. Burial 5 in Grave 19 also appears to be secondary. It was an incomplete skeleton with missing skull interred at the pit bottom with four complete burials arranged in three layers on top of it.

The mortuary protocol included sheets of birch bark to cover the burials and the use of pit-fires lit around the torso and abdomen of the deceased. In graves with multiple interments sheets of birch bark were placed on top of the upper layer of burials. In Graves 11A & 11B sheets of birch bark were found at the top of each level of interment. The burial in Grave 11B was affected by fire and its skull showed a stain from red ochre. In Grave 17, wooden sticks were documented below the sheets of birch bark.

Grave goods were found in all graves (Table 3), mostly around the head, abdomen, forearms/hands and lower legs/feet of the deceased. The number of objects varied depending on the condition of the grave: in particular, whether or not it was disturbed in the past and whether or not the skeleton and organic grave goods were affected by fire. Eight graves contained a total of 17 ceramic pots (Fig. 3: 1, 5–10). The most frequent was an egg-shaped pot with distinct rim (i.e., of ‘closed’ and ‘complex’ form) and round or pointy bottom. ‘Simple’ forms were rare. In most cases the surface was plain, though one showed net impressions (Gr. 29; Fig. 3: 8) and another had impressed lines—a side-effect of shaping the pot walls with a cord-wrapped paddle (Gr. 11B). In several instances, pots with different kinds of “technological” decoration (i.e., related to the manufacturing process) were found in the same grave. In 11 cases the upper part of the vessels was decorated. Most numerous (five instances) were simple patterns consisting of one element, typically a horizontal line forming one or more rows (Gr. 1, 29, 30, and 31; Fig. 3: 7). Patterns of short vertical lines (Gr. 19; Fig. 3: 5), a horizontal zig-zag (Gr. 1; Fig. 3: 9), a rhomboid lattice (Gr. 1; Fig. 3: 1), and a herring bone pattern (Gr. 17; Fig. 3: 6) were each found in one instance only. Two pots displayed a complex decoration consisting of a series of horizontal lines with short diagonal lines extending downwards from to lowest horizontal line (Gr. 29 and 30; Fig. 3: 10). In eight cases, the decoration was applied using stamp impressions: either rectangular (Gr. 1, 29, and 30), round (Gr. 1), bi-denticular (Gr. 31), or oval (Gr. 19). Two pots (Gr. 1 and 30) featured a pattern made of punctuated stamps and one (Gr. 17) displayed impressed lines. No pot had decoration applied with more than one kind of stamp.

Lithics included 15 arrowheads found in 4 graves. Most common were tanged forms ($n = 7$; Fig. 4: 1, 3–4) and points with a straight base ($n = 4$; Fig. 4: 5), while forms with a concave symmetrical ($n = 2$; Fig. 4: 2), round (1), or diamond-shaped (1) base were less common. Knives consisted of 3 bifaces of sub-triangular shape (Gr. 1 and 29; Fig. 4: 14), 3 ground green nephrite (Fig. 4: 12) and slate (Gr. 1 and 23),

and 6 specimens on blade-flakes with retouch along the cutting edge (Gr. 11, 19, 30, and 31). Other lithic grave goods included 6 green nephrite or slate adzes (Fig. 4: 13 and 15), 3 scrapers (Fig. 4: 9), 3 perforators, 12 prismatic blades, 16 blade-flakes or flakes (some retouched), 1 heavy scraper [скобель], 2 angle-burins (Fig. 4: 8), 2 drills (Fig. 4: 10 and 11), 2 blades for composite tools, 2 large side-scrapers-shaped tools [скребловидные орудия], 3 abraders made of coarse-grained sandstone, 3 pebble-hammers, and 1 pestle. Two graves contained small zoomorphic figurines: 1 fragment of a whitefish-shaped fish-lure (Gr. 30) and 1 stylized image resembling a stretched-out bear skin made of slate tablet (Gr. 11B; Fig. 5: 6).

Grave 17 contained 37 pieces of bone bow stiffeners (overall length of ~65 cm) recorded along the left side of the deceased (count of 1 in Table 3; Fig. 5: 5). A total of 20 red deer canine pendants were found in 3 graves (Fig. 5: 2). Other organic grave goods consisted of 2 needles (Fig. 5: 3), 4 needle boxes (Fig. 5: 4), 1 point (Fig. 5: 7), 1 harpoon fragment, and 18 fragments of unidentifiable objects.

2.6. Khuzhir-Nuge VI

The cemetery is located on the S-facing slope of a cape rounding the Khuzhir-Nuge Cove on the NW coast of the Little Sea mainland. Graves were situated 84–90 m above the lake, in subtle depressions between lines of bedrock outcrops. Six of the excavated graves were Serovo: Graves 1 to 4, 6 and 7 (Goriunova, 1997; Goriunova and Batrakova, 2005). The burials were interred in pits underneath oval or round surface stone structures measuring 5.0 × 4.0 m and aligned NWW–SEE. In four graves (Gr. 1, 4, 6, and 7), stones were found also inside the pits. The pit depth was 0.28–0.43 m from the modern surface. All graves contained single burials with the heads pointing N, with minor inclinations to the west. In two cases the body position could not be determined; in all others the burials were extended supine. All burials were affected by pit-fires and four were covered by sheets of birch bark (Gr. 1, 4, 6, and 7).

With the exception of Grave 1, all contained at least some grave goods. Grave 4 had the highest number ($n = 26$): 1 arrowhead with straight base, 1 ground green nephrite knife, 1 chisel-shaped tool, 3 knives with retouch along the edge, 1 slate adze, 10 blade-flakes (3 with retouch), 3 flakes, 4 antler flakers (Fig. 5: 1), 5 bone blades (bow stiffeners?; count of 1 in Table 3), and 1 ceramic pot with round base (Fig. 3: 3).

Four bone blades (bow stiffeners? count of 1 in Table 3) and a plain-surface ceramic pot were also found in Grave 6. The pot was egg-shaped of ‘complex’ form, its body decorated with five horizontal lines of denticulate stamps and the rim with diagonal incisions. Grave 7 also had a plain-surface ceramic pot decorated on the body with short vertical incised lines; the rim was similarly incised all around.

The disturbed graves had only very few items. Grave 3 contained 1 ground green nephrite knife and Grave 2 had 1 abrader, 1 pebble-flaker, and 1 rim fragment with small pits along the edge and incisions on the body.

2.7. Uliarba

The cemetery is located on the SE-facing slope of a hill situated at the base of Antukhai Mys, on the NW coast of Mukhor Bay, Little Sea. It is a large multicomponent cemetery with 33 graves arranged into 5 spatially distinct clusters (Uliarba IV): typologically, 6 graves belonged to the Neolithic and 27 to the EBA. Four Neolithic graves (Nos. 25, 26, 27, and 28) were located in the NW part of the cemetery, up the slope (23–28 m above the lake) from the larger EBA component. The other two Neolithic graves (Nos. 39 and 41) were found within the group of EBA graves about 19–21 m above the lake level (Goriunova et al., 2004).

All Neolithic burials were interred in pits underneath oval or round stone surface structures, measuring 2.6–4.0 × 3.2–5.0 m and aligned

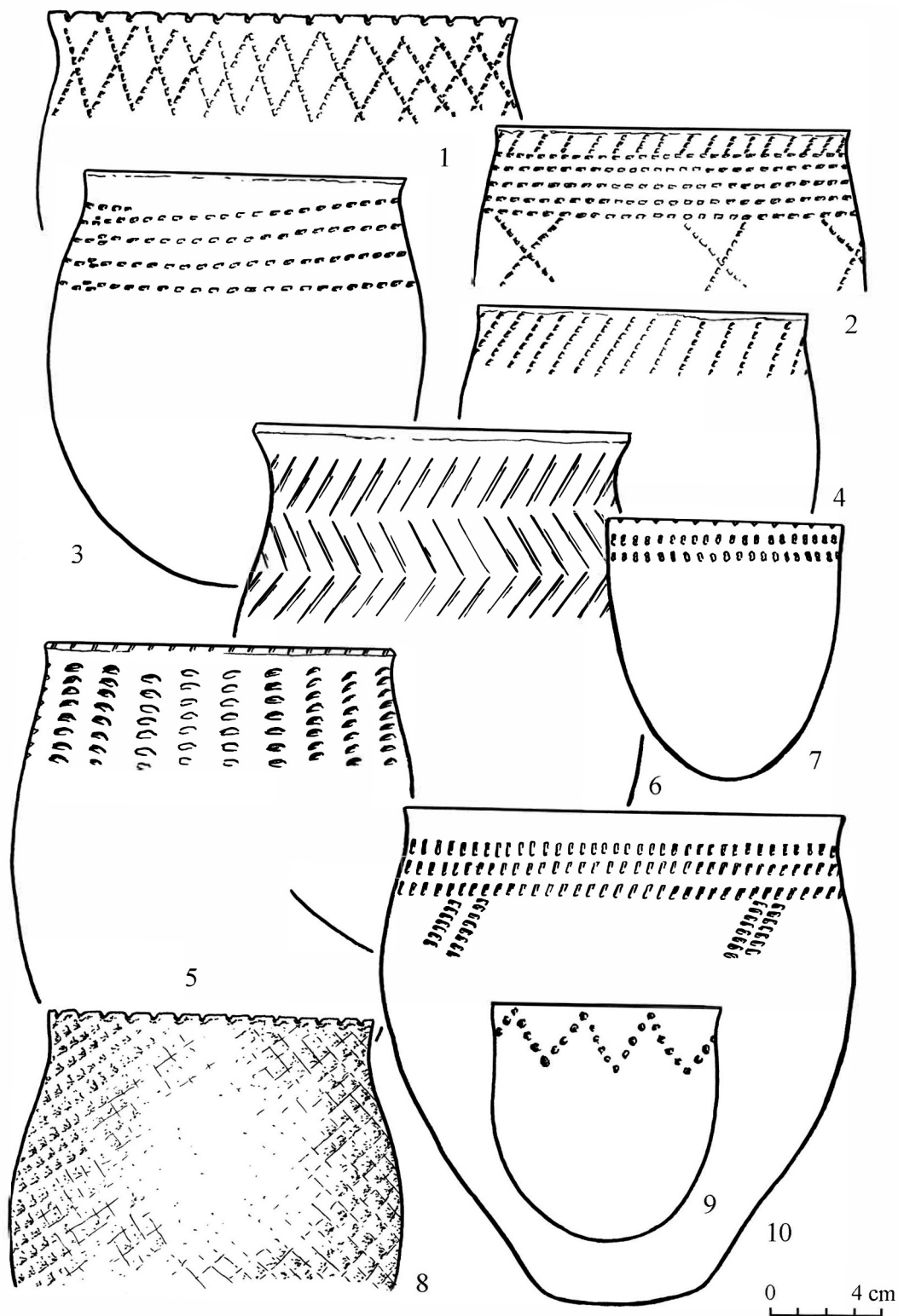


Fig. 3. Examples of ceramic vessels from Late Neolithic Serovo graves in the Little Sea microregion: 1 & 9–Sarminskii Mys, Grave 1; 2 & 4–Shrakshura II, Grave 2; 3–Khuzhir-Nuge VI, Grave 4; 5–Sarminskii Mys, Grave 19; 6–Sarminskii Mys, Grave 17; 7, 8 & 10–Sarminskii Mys, Grave 29.

NW–SE (Fig. 2: 1). The graves mostly began 0.6–0.7 m below the modern surface but one (Gr. 26) was only 0.3 m below. All interments were in extended supine position with the heads pointing NW. Most graves had single interments but Grave 28 had two, placed one on top of the other. In Graves 26, 27, and 28, the burials were affected by pit-fires and were covered by sheets of birch bark. In Grave 28 with two individuals, only the upper skeleton was treated with fire. Three graves

(Gr. 25, 39, and 41) had neither birch bark nor fires and also had no grave goods.

Grave goods were typically found around the heads and abdomens of the deceased. Graves 26 and 28 (upper level) had ceramic pots placed near the heads. Both vessels were round-bottomed and one was undecorated while the body of the other (Gr. 28) had pairs of short vertical lines made with rectangular stamps. The rims of both pots were

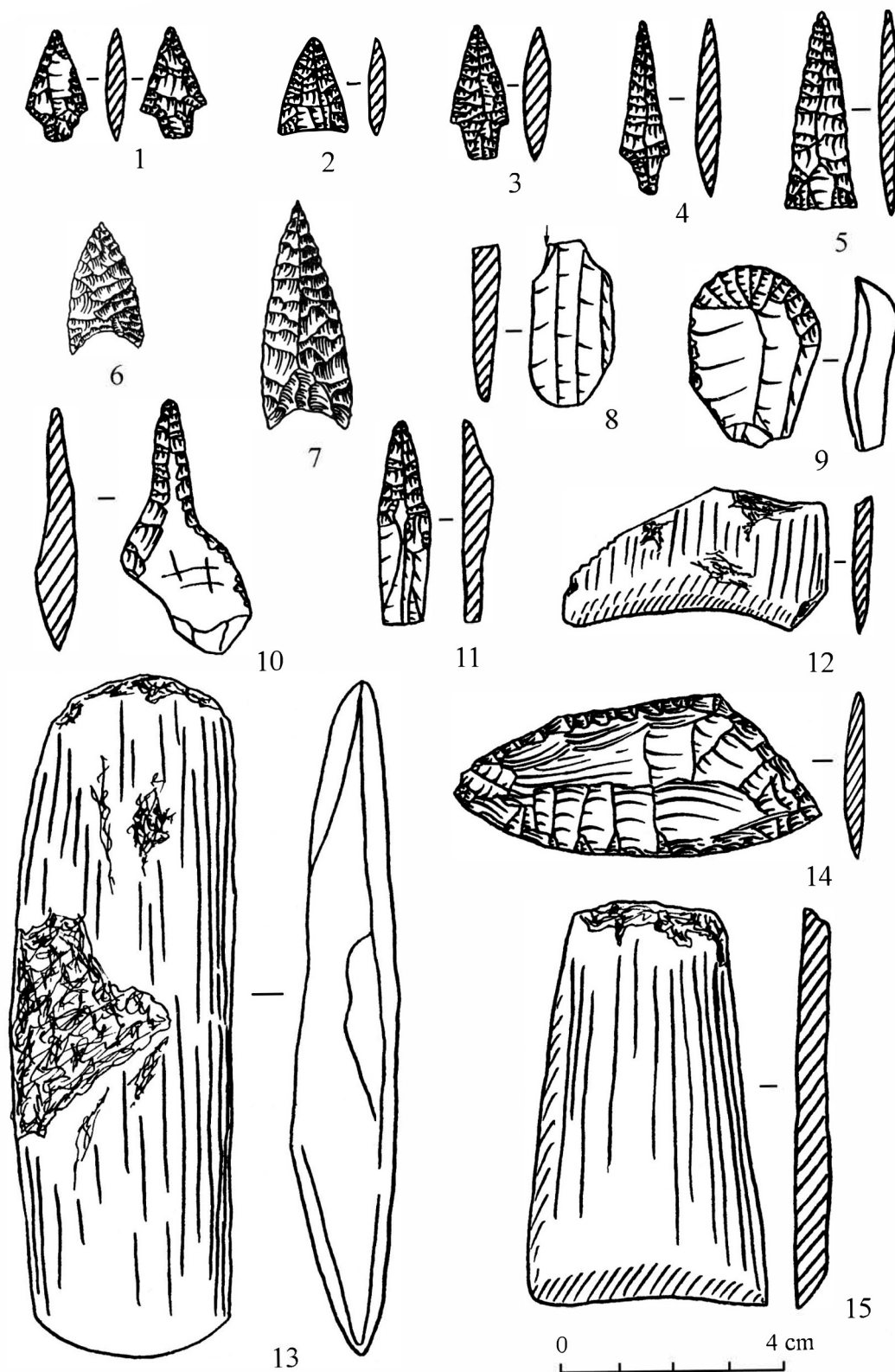


Fig. 4. Examples of typical lithic objects from Late Neolithic Serovo graves in the Little Sea microregion: arrowheads: 1, 2 & 4–Sarminskii Mys, Grave 30; 3 – Sarminskii Mys, Grave 1; 5–Sarminskii Mys, Grave 23; 6 & 7–Shamanskii Mys I, Grave 1(1976 r.); 8–burin, Sarminskii Mys, Grave 30; 9–scraper, Sarminskii Mys, Grave 11B; drills: 10–Sarminskii Mys, Grave 29; 11–Sarminskii Mys, Grave 30; 12–ground green nephrite knife, Sarminskii Mys, Grave 1; 13–green nephrite slate adze, Sarminskii Mys, Grave 11B; 14–bifacial knife, Sarminskii Mys, Grave 29; 15–green nephrite slate adze, Sarminskii Mys, Grave 1. (For interpretation of the references to colour in this figure legend, the reader is referred to the web version of this article.)

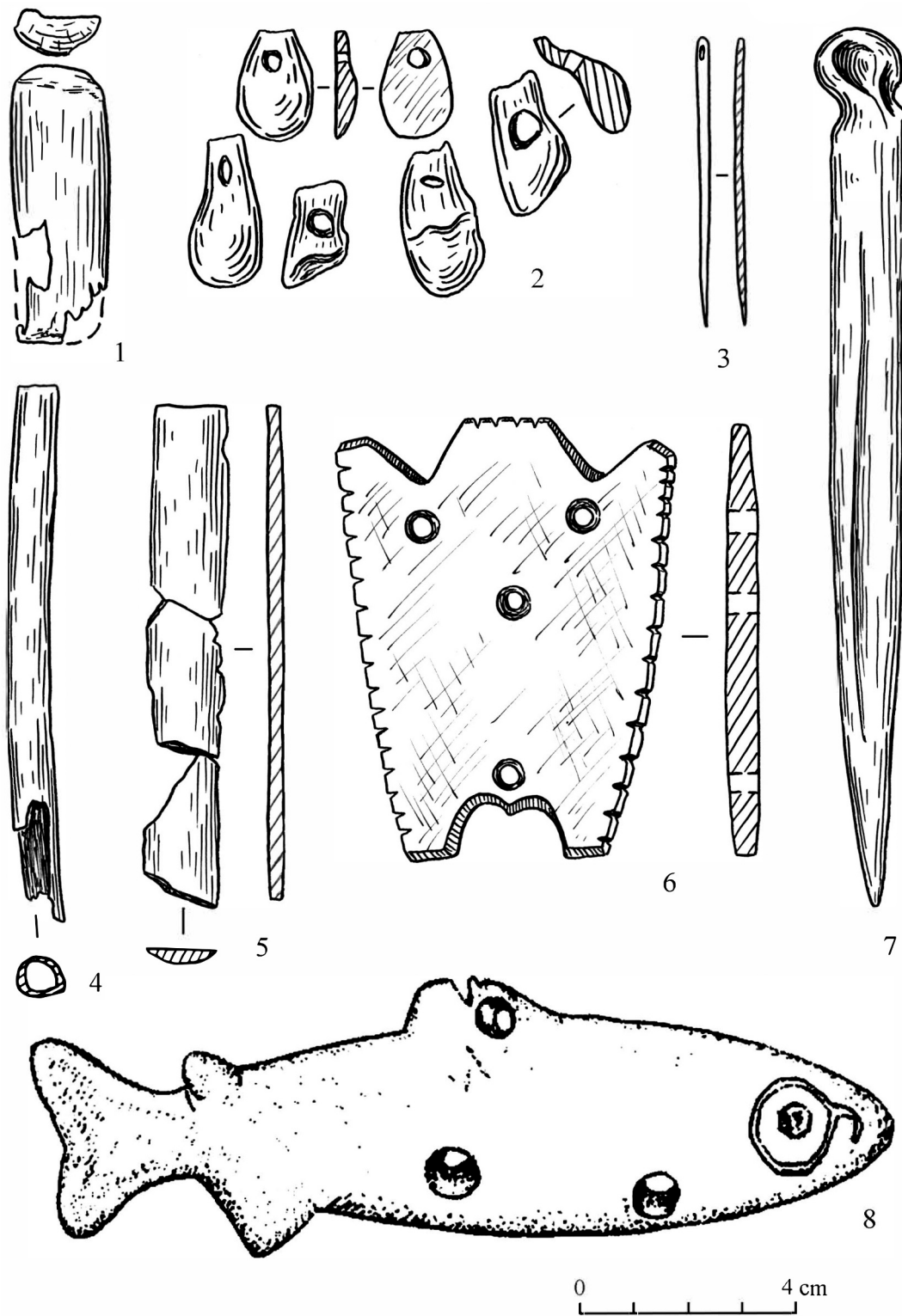


Fig. 5. Examples of other grave goods from Late Neolithic Serovo graves in the Little Sea microregion: 1– antler flaker, Khuzhir-Nuge VI, Grave 4; 2–red deer canine pendants, Sarminskii Mys, Grave11B; 3–needle (bone), Sarminskii Mys, Grave 31; 4–needle box (bone), Sarminskii Mys, Grave 11B; 5–bone bow stiffener, Sarminskii Mys, Grave 17; 6–zoomorphic portable art object (slate), Sarminskii Mys, Grave 11B; 7–bone point, Sarminskii Mys, Grave 30; 8–white fish-shaped fish-lure, Shamanskii Mys I, Grave 3–1975. (For interpretation of the references to colour in this figure legend, the reader is referred to the web version of this article.)

decorated with incisions. Considered together, lithic grave goods comprised 1 slate axe, 1 ground slate and 1 green nephrite adze, 2 bifacial knives, 1 ground slate knife, and 1 retouched flake. Grave 27 contained 1 fragment of a bone or antler shaft of a composite tool with single side-groove, 1 point, and 1 red deer canine pendant.

For the purpose of this review, all six Neolithic graves are considered part of the Serovo group. However, for Graves 25, 39, and 41 this is based solely on the NW orientation of the burials. Since the generally northern orientation of burials also characterizes the EN graves of the area, there are no radiocarbon dates available for these

graves, and they do not show any other mortuary characteristics typical of the Serovo mortuary tradition, this classification is regarded as tentative.

2.8. *Shrakshura II*

One of two graves excavated on the SW-facing slope of *Shrakshura Mys*, on the NW coast of Mukhor Bay in the Little Sea, has been classified as Serovo (Goriunova, 1997). Grave 2 was built 27 m above the lake in a depression between two bedrock outcrops. The burial was interred in a pit covered by an oval surface stone structure, 4.5 × 3.7 m in size and aligned NNE–SSW. The grave pit, which began 0.50 m below the modern surface, also held some stones. The grave contained a single interment in extended supine position with the head pointing NNE. The skeleton was charred due to pit-fires.

Grave goods consisted of 1 end-scraper, 1 multi-tool (knife and point), 3 flakes (2 with retouch), and fragments of 2 ceramic pots, both egg-shaped and plain-surface, with slightly everted rims. One pot was decorated with a composition of diagonal and horizontal lines, below which there were intersecting lines forming an “×” (Fig. 3: 2). All lines were made with impressions of punctuated stamps and the inner edge of the rim was decorated with the same stamps. The other pot was decorated with short diagonal lines of punctuated stamps (Fig. 3: 4).

2.9. *Khalurinskii Mys I*

Graves 1 and 2 were excavated in depressions between bedrock outcrops, one 34 m and one 42 m above the lake, on the NW coast of Mukhor Bay in the Little Sea. In both cases the burials were placed in pits underneath surface stone structures, about 4.0 × 4.3 m in size, and aligned NS. A few rocks were also present in the pits, which began 0.50–0.58 m below the modern surface. Both graves were disturbed in the past and probably originally contained single interments and both had pit-fires. Grave 1 had only skull fragments and some charred bones remaining. Based on the distribution of the charred skeletal remains in Grave 2, the burial was probably extended supine with the head pointing NNE. Grave 2 contained some remnants of birch bark sheets covering the burial.

Grave goods were found mainly in Grave 2 and included the following lithic objects: 4 arrowheads with concave symmetrical base, 2 ground slate knives, 1 knife with edge retouch along the blade, 1 blade-flake with retouch, 1 flake, and 1 abrader. The grave also contained fragments of two ceramic pots, both egg-shaped of ‘complex’ form and with plain-surface. One pot was decorated with paired vertical lines of oval stamped impressions and incisions on the rim. The body of the other pot was decorated with horizontal rows of punctuated stamps. The same stamp was also applied to the edge of the rim. The disturbed Grave 1 contained only 1 ground knife made of green nephrite.

2.10. *Ulan-Khada*

Ulan-Khada is another multi-cluster (IV) and multi-component cemetery located in Mukhor Bay, with graves dating to the EN, LN, and EBA (Komarova and Sher, 1992; Weber et al., 2020). The locality is also known for the nearby campsite excavated first by B.E. Petri in 1913 and, subsequently, by a few other teams (Goriunova, 1984; Goriunova and Khlobystin, 1992; Griaznov and Komarova, 1992; Khlobystin, 1969). None of the three graves that have been recently radiocarbon-dated to the LN are included in this analysis. Two of them (*Ulan-Khada IV Gr. 12* and *Gr. 14*, both excavated in 1959) have radiocarbon dates that, while putting them at the very beginning of the LN at the scale of the entire Cis-Baikal, predate by about 800 years the period in the Little Sea, as established by the 25 corrected dates that form a rather continuous distribution over time (Weber et al., 2020). Examination of the mortuary characteristics of these two graves in the context of the much younger group of Little Sea–Serovo graves may bias the results. One other grave from this cemetery (*Ulan-Khada V Gr. 1–1959*) has a

radiocarbon date that fits with the rest of the dates available for Serovo graves in the Little Sea (Table 8; Weber et al., 2020); however, the grave was heavily disturbed in the past and not much is known about its mortuary characteristics. In sum, all three graves are excluded from the assessment of the Serovo mortuary ritual but their dates are presented in Table 8 for comparative purposes.

3. Discussion: Mortuary protocol

Two points will be discussed in this section: one is the nature of the Little Sea–Serovo mortuary protocol and how it relates to contemporaneous developments in the other microregions of the broader Cis-Baikal; the other regards comparison with EN mortuary practices in the Little Sea analyzed in a similar fashion in a separate paper of this special issue, which facilitates direct and more systematic assessment (Goriunova et al., 2020).

3.1. *Serovo mortuary protocol*

The main characteristics of the Serovo mortuary protocol in the Little Sea microregion are summarized in Tables 2 and 3. Analysis of topographic location, cemetery size, grave architecture, body position and orientation, arrangement of the deceased, and other particularities of the mortuary ritual as well as the morphology of grave goods, brings the mortuary practices of the Little Sea–Serovo into sharper focus.

It appears that the current dataset of 39 graves with 67 burials from 9 localities forms a relatively homogenous sample in just about every aspect of mortuary ritual. All sites were located on the S slope of a hill or cape at least 20 m above the level of Lake Baikal. As a rule, the cemeteries were rather small. *Sarminskii Mys* and *Khuzhir-Nuge VI*, with 12 and 6 graves respectively, are the largest in the group. At *Sarminskii Mys*, Graves 11(A&B), 17, 19, 29, 30(A&B), and 31 were arranged parallel to one another and about 1–6 m apart, in a line running SW–NE. Such rows of graves are known from several EN, LN, and EBA cemeteries across Cis-Baikal and are believed to represent kin groups (Bazaliiskii, 2012; Goriunova, 1997; Okladnikov, 1950, 1978; Weber and Goriunova, 2013). Currently, *Sarminskii Mys* is the only Serovo cemetery in the microregion showing such spatial organization.

All graves had some sort of stone structure: on the surface, in the pit, or both (Tables 2 and 4). The surface structures, typically oval, were built of stones arranged in several layers and measured 2.0–4.0 × 3.5–5.0 m (Fig. 2: 1). Some of these structures had been disturbed in the past, resulting in irregular circles of stones at the time of archaeological excavation. The size and form of surface structures built for graves with multiple interments did not differ from those with only one burial. Grave 30(A&B) at *Sarminskii Mys* had two pits close to one another, both filled with rocks and covered by an arrangement of surface stones over both pits. Grave pits were 0.30–0.70 m deep and some had a slab set vertically at the head end (*Sarminskii Mys Gr. 1* and *Gr. 11A*, *Shamanskii Mys Gr. 1–1976*, and *Khuzhir-Nuge VI Gr. 6*). Three graves had the bottom lined with slabs (*Sarminskii Mys Gr. 1* and *Gr. 6* and *Khalurinskii Mys Gr. 1*).

The most defining characteristics of the Serovo mortuary ritual in the Little Sea are the use of the pit-fires lit directly on top of the chest/abdomen of the deceased and birch bark sheets to cover the dead, documented for 72% and 52% of all burials, respectively (Table 4). The degree to which the skeletal remains were charred depended on the intensity and duration of the fire. Wooden sticks were discovered underneath sheets of birch bark in Grave 17 at *Sarminskii Mys*. In graves with multiple interments birch bark and fires were found only on top of the upper level of burials. The three graves from *Uliarba* (*Gr. 25, 39, and 41*) had no birch bark, fires, or grave goods but, as mentioned earlier, their LN chronological position is tentative. Small stains of red ochre were documented in four graves: Grave 27, lower level at *Budun IV*, Grave 2–1978 at *Kharansa I*, Grave 1–1976 at *Shamanskii Mys I*, and Grave 11B at *Sarminskii Mys*. In the first two they were found on pelvic bones, at *Sarminskii Mys* on the skull, and at *Shamanskii Mys I* on some grave goods.

Table 4
Comparison between Early and Late Neolithic mortuary protocols in the Little Sea microregion: Grave architecture.

	Little Sea, Early Neolithic		Little Sea, Late Neolithic	
	No. of Graves	% of total Graves	No. of Graves	% of total Graves
Grave disturbances				
Relatively intact	31	100%	30	77%
Extensively disturbed	0	0%	9	23%
Totals	31	100%	39	100%
Stone structures				
No stones	2	8%	0	0%
Surface structures only	5	19%	20	51%
Grave pit structures only	4	15%	1	3%
Surface and grave pit structures	15	58%	18	46%
Totals	26	100%	39	100%
	No. of Burials	% of total Burials	No. of Burials	% of total Burials
Pit-fires				
Present	2	8%	48	72%
Absent	15	58%	19	28%
Totals	26	65%	67	100%
Sheets of birch bark				
Present	1	3%	35	52%
Absent	30	97%	32	48%
Totals	31	100%	67	100%
Ochre				
Full coverage by ochre	13	42%	0	0%
Spots of ochre	6	19%	4	6%
No ochre	12	39%	63	94%
Totals	31	100%	67	100%

Based on data from Table 2 and from Goriunova et al., 2020: Table 2.

The use of pit-fires and red ochre³ is also known from Serovo graves in the Angara valley and on the Upper Lena, though it is not as common in either area as in the Little Sea (particularly with regards to the pit-fires). On the Angara they were found in Graves 17 and 24 at Ponomarevo, Grave 1 at Pad' Ust'-Dolgaia, Grave 1 at Verkhneseredkino, and Graves 9 and 13 at Serovo (Okladnikov, 1974: 70, 108–109; 1975: 14, 100–103; 1976: 82–83). On the Upper Lena they were documented at Verkholsk in Graves 10 and 24 of the Archaic group, the local variant of Serovo according to Okladnikov (1978); Bazaliiskii, 2012). The orientation of the burials and assortment and morphological characteristics of the grave goods were all different at these sites.

The dominant body position was extended supine (Fig. 2: 2, Tables 2 and 5). The exception to this pattern were the three burials from Grave 27 and the interments in the group Grave 1–2015 at Budun IV, all of which were laid on their side with flexed legs (Fig. 2: 3). The orientation was generally to the N, with minor inclinations to the NW or, rarely, the NE. While most interments were primary, three burials appeared to be secondary (Burial 5 in Gr. 19 and Burials 2 and 3 in Gr. 31, all at Sarminskii Mys). For the record, in Cis-Baikal the custom of delayed interments (after exposure over some time) was already occurring in the EN and was relatively common during the EBA (Bazaliiskii, 2012; Novikov, 2007). Two graves contained burials in multiple positions. In Grave 31 at Sarminskii Mys one individual was placed in extended supine position while two were a pile of bones (secondary burials). In Grave 1–2015 at Budun IV, six were interred extended supine and one on its side with flexed legs. This suggests that different body positions were in use at the same time.

A relatively large number of Little Sea–Serovo graves had multiple interments: 4 with 2 burials, 5 with 3, 2 with 5, and 1 with 7 bodies for a total of 40 burials (60%) in 12 graves (Table 5). An additional 27 individuals (40%) were interred in graves on their own. In all graves with more than one burial, the bodies were arranged one on top of the other in two or three

layers, with subadults (if present) at the top and adults at the bottom. In two graves (Gr. 29 at Sarminskii Mys and Gr. 1–1976 at Shamanskii Mys) the burials were separated by a layer of stone slabs. Based on observations from the intact graves regarding characteristics such as the arrangement of burials, the sheets of birch bark over the upper level of interments and the employment of pit-fires, the burials in graves with multiple individuals were likely interred at the same time. There were, perhaps, two exceptions to this pattern: the first regards Graves 30A and 30B at Sarminskii Mys arranged side-by-side as two separate pits under one common surface stone structure, and the other relates to Graves 11A and 11B from the same cemetery separated from one another vertically by a layer of stone slabs and each containing birch bark and pit-fires. In a way, the layer of stones separating the two burial levels at Grave 11 at Sarminskii Mys was similar to the arrangement of the two graves mentioned earlier.

At least some grave goods were found in all graves (Tables 2, 3, 7 and 8). Among the relatively intact graves ($n = 30$) the counts of objects are 11.2 per grave and 6.2 per burial and among the heavily disturbed graves ($n = 9$) these numbers are 2.2 and 1.3, respectively, showing that their grave good assemblage was indeed very poor. However, both groups of graves display equally low grave good diversity measured as the number of grave good categories per grave or burial. Moreover, “Bow and arrow technology” and “Composite tools and weapons” are lacking in the disturbed graves while they are among the most common groups in the intact graves (Table 8). The sample size is too small to claim that removal of such artefacts was one of the reasons for which the graves were disturbed but the pattern seems to be real.

As mentioned, the culture-historical classification of Graves 25, 39, and 41 at Uliarba and to a lesser extent of Grave 28 at Budun IV—all with no grave goods—is difficult. Evidence for the use of pit-fires, well-documented in Serovo graves, seems to be a relatively strong indication that Grave 28 at Budun IV indeed belongs to that mortuary tradition, further confirmed by the associated radiocarbon date. However, the chronological position of the three graves from Uliarba, which lack other diagnostic mortuary characteristics, remains unclear and can only be addressed through radiocarbon dating. More specifically, an EN age for them cannot be ruled out at this time (Goriunova et al., 2020).

³ The use of copious amounts of red ochre is one of the defining characteristics of the Kitoi mortuary pattern from the Angara valley and Southwest Baikal (e.g., Bazaliiskii, 2010).

Table 5
Comparison between Early and Late Neolithic mortuary protocols in the Little Sea microregion: Body position and orientation.

Body position	Little Sea, Early Neolithic		Little Sea, Late Neolithic	
	No. of Burials	% of total Burials	No. of Burials	% of total Burials
Supine extended	6	22%	50	93%
Supine with flexed legs	8	30%	0	0%
On side with flexed legs (slightly to tight)	13	48%	4	7%
Total	27	100%	54	100%

Orientation of the head	Little Sea, Early Neolithic		Little Sea, Late Neolithic	
	No. of Burials	% of total Burials	No. of Burials	% of total Burials
North (including minor inclinations to E or W)	24	86%	61	100%
South	3	11%	0	0%
East	1	4%	0	0%
West	0	0%	0	0%
Total	28	100%	61	100%

Based on data from Table 2 and from Goriunova et al., 2020: Table 2.

Grave goods were documented around the head, abdomen, forearms/hands, and lower legs/feet of the dead. Ceramic pots ($n = 34$) were common, found in 24 of the 39 graves. The most frequent style was the 'closed' and 'complex' form with round (egg-shaped) or pointy bottom (i.e., mitre-shaped) (Fig. 3). Pots of the 'simple' form were rare. Most vessels were plain-surface, but some had net-impressions ($n = 3$) or incisions ($n = 1$). Typically, they were decorated on the upper part of the body and along the edge of the rim, employing the motif of horizontal or vertical lines, or a combination of the two. Other patterns, such as a rhomboid lattice, horizontal zigzag, or herring bone, were represented by single instances. The decoration was applied using stamp impressions of various shapes (e.g., punctuated stamp) or incised lines.

The decoration on pots from Little Sea–Serovo graves finds analogies among vessels from Serovo graves in the Angara valley. Similarities regard the patterns, composition, and techniques with which the decoration was applied. Plain-surface pottery decorated with stamps of various shapes was recorded in Grave 1 at Podostrozhnoe–Gorodishche, Grave 1 at Verkhneseredkino, Grave 1 at Pad' Ust'-Dolgaia, Grave 2 at Nezhneseredkino, Graves 6, 12, and 13 at Serovo, and Grave 25 at Ponomarevo (Okladnikov, 1974: Fig. 16; Okladnikov, 1975: Fig. 23, 27 and 28; Okladnikov, 1976: 82–83). The motif of punctuated stamps was also found on pots with smoothed net-impressions (Gr. 10 and 11 at Serovo), while the pattern of incised lines occurred in Grave 24 at Podostrozhnoe (Okladnikov, 1974: Fig. 15).

A relatively large number of the Little Sea–Serovo lithic grave goods were related to hunting. For example, 47 arrowheads were collected from 10 graves. Among these, the most frequent had tangs ($n = 13$) and symmetrical concave bases ($n = 24$) while those with straight ($n = 6$) or round ($n = 1$) bases, or those that were rhombic-shaped ($n = 3$) were rare (Fig. 4: 1–7). Bow stiffeners made of bone, so well-known from Serovo graves on the Angara (Bazaliiskii, 2012; Okladnikov, 1950) were found in five graves, in one case particularly well-preserved (Gr. 17, Sarminskii Mys).

Objects related to fishing were rare and included 1 harpoon fragment, 1 bone fishhook barb, 1 simple bone fishhook, and 2 whitefish- and 2 burbot-shaped fish-lures. Showing a similar manner and technique of image composition to other such lures, the whitefish forms are believed to be characteristic of the Serovo assemblages of Cis-Baikal (Okladnikov, 1936, 1950: 242–250; Studzitskaia, 1972: 6; Studzitskaia, 1976: 76–77).

Implements made of ground slate or green nephrite composed a large group (Fig. 4: 12, 13, 15), which included 15 adzes, 2 axes, 16 knives, and 1 awl. Other stone tools were represented by 15 prismatic blades, 18 blade-flakes, 23 flakes (some with retouch), 12 knives with retouched cutting edge, 6 scrapers (Fig. 4: 9), 8 bifacial knives (Fig. 4: 14), 3 angle-burins, 3 perforators, 2 drills (Fig. 4: 10, 11), 6 bifaces for

composite tools as well as abraders and pebble-flakers (each $n = 5$). Prismatic blades for composite tools and *skreblo*-shaped tools were both represented by two items each. *Skobels*, chisel-shaped tools, pestles, and multi-tools were all represented by one item each.

Among bone and antler grave goods were 9 points (Fig. 5: 7), 1 awl, 4 shafts of composite tools, 4 antler flakers (Fig. 5: 1), and 5 needle boxes and 4 needles (Fig. 5: 3, 4). Ornaments were limited to pendants made of red deer canines (Fig. 5: 2) or longitudinally-split boar tusks, and tube beads. Unique was the object made of a slate tablet fashioned into a stretched-out bear skin decorated with four perforations (a stylized representation of a face) and notches along the edges (Fig. 5: 6).

With regards to the main characteristics of the mortuary protocol, the Little Sea–Serovo group bears many similarities to Serovo assemblages from the Angara valley (Okladnikov, 1950, 1974, 1975, 1976). These include: (1) The presence of stone structures on the surface and inside grave pits; (2) Extended supine body position; (3) Graves with multiple burials; and (4) The assortment and morphology of grave goods such as ceramic pots as well as a range of objects made of stone, bone, and antler (e.g., ground adzes, axes, and knives made of green nephrite or slate, bifacial knives, whitefish-shaped fish-lures, arrowheads with tangs or symmetrical concave bases, bone bow stiffeners, and antler flakers). However, the assemblage of grave goods in the Little Sea seems to be a much-impooverished version of the Angara–Serovo assemblage both in terms of diversity and quantity (Bazaliiskii, 2010). Other differences include the use of pit-fires, the sheets of birch bark to cover the dead, and the layered arrangement of burials, all absent on the Angara, and the orientation of the dead (see below for elaboration on this last point).

Comparison with LN Serovo graves in the Upper Lena microregion provides additional insights. Similarities include: (1) The presence of stone structures on the surface and inside grave pits; (2) Extended supine body position; (3) The dominance of single burials with occasional double or multiple interments; (4) The layered arrangement of burials; (5) The use of pit-fires, although not as common as in the Little Sea; (6) The use, although infrequent, of sheets of birch bark to cover the dead; (7) The occasional presence of small stains of red ochre; and (8) The frequent presence of ceramic vessels among grave goods.

There are also a number of differences between the two microregions. The Upper Lena–Serovo graves: (1) Are oriented E–W with the heads pointing east (away from the river), a pattern seen also in Serovo graves on the Angara; (2) Have more numerous grave goods; (3) Have a much higher number of grave goods related to fishing including bone shafts of composite fishhooks with a knob (*набалдашник*); (4) Have fewer bow stiffeners (known perhaps only from Gr. 17 at Verkholsk; Okladnikov, 1978: 161); (5) Have very few tanged arrowheads; (6)

Have stepped (*ступенчатые*) slate adzes similar to specimens known from Yakutia (Okladnikov, 1978: 105); (7) Have double-sided harpoons similar to specimens documented in Isakovo graves on the Angara; and (8) Show a pattern of placing sharp objects (i.e., points of various kinds) close to the hands of the deceased. Additional differences concern the morphological characteristics of some grave goods. For example, the methods of finishing the external surface of ceramic vessels appear to be different and so were the motifs and techniques for applying decoration. Furthermore, the assemblage of grave goods on the Upper Lena includes such objects as harpoons with a perforation at the base for line attachment (Verkholensk Gr. 7, 14, 18, 32, and 34; Okladnikov, 1978), bone spoons/spatulas, and arrow shaft straighteners – all so far lacking from the Little Sea–Serovo graves. Lastly, Verkholensk, the largest cemetery on the Upper Lena with about 25 known LN graves (White et al., 2020), is much larger than Sarminskii Mys, the largest cemetery in the Little Sea with 12 graves only.

3.2. Early Neolithic (Khotoruk–Kurma) and Late Neolithic (Serovo) mortuary protocols in the Little Sea

As noted, the similar review of EN mortuary materials from the Little Sea microregion by Goriunova et al., 2020 allows a fresh comparison between these two periods. The comparison does not extend to the EBA for the following three reasons. First, EBA materials have not been summarized yet in the same manner as the EN materials. Second, summarizing the large body of EBA data (~200 graves) requires an approach exceeding the scope and space limits of this study. And third, typological classification of EBA graves rarely poses difficulties. Conversely, it has not been uncommon to confuse EN and LN graves and their systematic comparison is thus considered a practical exercise assisted further by similar sample sizes.

Although Goriunova et al., 2020 define two separate and coexistent EN mortuary groups for the Little Sea, i.e., Khotoruk and Kurma, here they are considered together, due to the strong similarities between them and the small sample sizes. The focus for comparison of the Khotoruk–Kurma group (EN) with the Little Sea–Serovo (LN) group will be on cemetery location, size and structure; grave architectural elements and disturbances; the number of burials per grave, their body position and orientation; and grave goods.

Cemeteries of both periods share a topographic location on elevated slopes of hills or capes in close proximity to the coast of Lake Baikal, underscored by the fact that some (e.g., Sarminskii Mys, Shamanskii Mys, and Ulan-Khada) have graves from both periods (as well as from the EBA). Only one cemetery, Khotoruk (EN), was located on the coast of the open lake while all others were on the coast of the Little Sea Gulf. All were similarly small in size, never exceeding 12 graves per cemetery. The number of documented cemeteries (8 EN and 9 LN) is roughly the same but the number of EN graves and burials is somewhat lower than for the

LN: 24 and 31 vs. 39 and 67, respectively (Table 6). The work currently in progress at the EN Mys Uiuiga cemetery will increase the number of EN graves but is unlikely to substantially increase the number of burials as most of the EN graves there contain single interments (A. Kharinskii and D. Kichigin, personal communication). The majority of EN and LN graves are scattered but form rows in two instances: at Kurma XI (EN) and Sarminskii Mys (LN). The rarity of such rows in the Little Sea is probably due to the small size of the cemeteries there. Note that rows of graves are, as mentioned, common at all medium and large EN, LN, and EBA cemeteries across the Cis-Baikal region.

Graves of both periods were constructed in essentially the same way (Table 4). Length was only what was needed to accommodate the body of the deceased and depth rarely exceeded 0.7 m from the modern surface (and then only at Khotoruk-EN). The pits were almost always filled with rocks and invariably covered by a pile of rocks which would have originally formed low cairns. A few of the LN grave bottoms were also lined with stone slabs but this can hardly be considered a diagnostic LN characteristic. Although not strictly an architectural element, the fact that 9 (out of 39; 23%) LN and no EN graves were heavily disturbed in the past, is perhaps the only aspect of grave structure that seems to set these two periods apart.

There are some notable differences with regard to the number of individuals per grave between the two periods (Table 6). While the number of graves with single interments is generally the same (75% in the EN vs. 69% in the LN), EN graves with single burials account for 58% of all interments while during the LN such graves account for only 40% of all interments. In other words, LN graves with multiple interments tend to contain more individuals than EN graves with multiple burials. A relatively large number of LN graves have more than three individuals interred: 21% vs. 4% of EN graves, representing 47% of LN vs. 10% of EN individuals. In contrast, graves with 2 individuals appear to be more common in the EN: 21% of EN vs. 10% of LN graves; and 32% of EN vs. 12% of LN individuals. Clearly the limit for multiple interments in one grave and the number of the dead disposed of in such graves was much lower during the EN than during the LN. Interestingly, it was not uncommon for the large EN Kitoi cemeteries on the Angara River and in Southwest Baikal (e.g., Lokomotiv, Kitoi, Ust'-Belaia I, and Shamanka II) to have more than three burials per grave (e.g., Bazaliiskii, 2010).

The two mortuary groups share much regarding the placement and orientation of the deceased (Tables 2 and 5; Goriunova et al., 2020: Table 2). Overall, the most frequent position was supine. However, EN burials were split evenly between supine (6 extended and 8 with flexed legs) and on the side with legs flexed ($n = 14$). In other words, 79% of all EN burials had flexed legs. In contrast, only 8% of LN interments had flexed legs (all on their side) and the remaining 92% were in extended supine position. The orientation of the head was even more uniform across the two groups with 86% of EN and 100% of LN burials pointing to the north. Among EN burials there were two kinds of exceptions to this pattern. One regards burials with heads pointing south in graves with interments arranged in opposing positions (head-to-toe at Khotoruk Gr. 2 and toe-to-toe at Khonkhoiskaia Guba Gr. 5; Goriunova et al., 2020: Table 2). Since single burials with such an orientation are lacking, it can be argued that the deciding factor behind the southward direction of the head was not a norm regarding body orientation but a norm regarding oppositional placement of the dead. The other exception is the EN burial from Grave 3–1972 at Shamanskii Mys on Ol'khon Island, where the head pointed east. This burial stands out from the rest also on the account of its large and diverse grave good assemblage which included typical Kitoi shanks of composite fishhooks, a mitre-shaped pot with net impressions (Table 3)—similar to pots from several Kitoi graves in the Angara valley and at Shamanka II, as well as the interments of two dogs (Konopatskii, 1982). Excluding this grave from calculations increases the frequency of EN Little Sea burials with the northern orientation to 89%. In sum, the overwhelmingly dominant orientation of the body in both periods was to the north.

The relatively large number of minor morphological differences between the Khotoruk–Kurma and Little Sea–Serovo grave goods makes

Table 6

Comparison between Early and Late Neolithic mortuary protocols in the Little Sea microregion: Number of graves and burials.

No. of burials in grave	Little Sea, Early Neolithic				Little Sea, Late Neolithic			
	No. of graves	% of total graves	No. of burials	% of total burials	No. of graves	% of total graves	No. of burials	% of total burials
1	18	75%	18	58%	27	69%	27	40%
2	5	21%	10	32%	4	10%	8	12%
3	1	4%	3	10%	5	13%	15	22%
4	0	0%	0	0%	0	0%	0	0%
5	0	0%	0	0%	2	5%	10	15%
6	0	0%	0	0%	0	0%	0	0%
7	0	0%	0	0%	1	3%	7	10%
Total	24	100%	31	100%	39	100%	67	100%

EN graves with no human skeletal remains are excluded from the counts. Based on data from Table 2 and from Goriunova et al., 2020: Table 2.

Table 7

Comparison between Early and Late Neolithic mortuary protocols in the Little Sea microregion: Distribution of grave goods.

A. Counts of grave goods and grave good categories.						
Grave good variable	Number of Graves	% of total Graves	Number of Burials	% of total Burials	Number of Grave goods	Number of Categories
Little Sea, Early Neolithic, all graves						
Graves with grave goods	14	54%	20	65%	138	30
Graves without grave goods	12	46%	11	35%	0	0
Total graves	26	100%	31	100%	138	30
Little Sea, Early Neolithic, excl. SHM_1972.003						
Graves with grave goods	13	52%	19	63%	79	18
Graves without grave goods	12	48%	11	37%	0	0
Total graves	25	100%	30	100%	79	18
Little Sea, Late Neolithic, all graves						
Graves with grave goods	33	85%	59	88%	316	39
Graves without grave goods	6	15%	8	12%	0	0
Total graves	39	100%	67	100%	316	39
Little Sea, Late Neolithic, relatively intact graves						
Graves with grave goods	27	90%	49	91%	303	39
Graves without grave goods	3	10%	5	9%	0	0
Total graves	30	100%	54	100%	303	39
Little Sea, Late Neolithic, extensively disturbed graves						
Graves with grave goods	6	67%	10	77%	13	8
Graves without grave goods	3	33%	3	23%	0	0
Total graves	9	100%	13	100%	13	8
B. Counts of grave goods and grave good categories per grave and per burial in graves with at least one grave good.						
Period: graves	Grave goods		Grave good categories			
	Per grave	Per burial	Per grave	Per burial		
EN: all graves	9.9	6.9	2.1	1.5		
EN: excl. SHM_1972.003 grave	6.1	4.2	1.4	0.9		
LN: all graves	9.6	5.4	1.2	0.7		
LN: relatively intact graves	11.2	6.2	1.4	0.8		
LN: extensively disturbed graves	2.2	1.3	1.3	0.8		

Based on data from [Tables 2 and 3](#) and from [Goriunova et al., 2020: Tables 2 and 3](#).

direct comparison difficult. It is perhaps more useful to focus first on a few quantitative aspects of grave good distribution and, next, to group some of the grave goods into broader functional categories for further comparison.

The data assembled in [Table 7](#) provide a few useful insights. First, almost half of EN graves and around one-third of burials were entirely lacking in grave goods, which is much higher than in the LN. However, since it is not possible to tell which burials in graves with multiple individuals were interred without grave goods, and quite likely some were, the proportion of burials with no grave goods could, in fact, be somewhat higher for both groups—particularly for the LN group because more burials were interred in such graves. Second, on initial comparison, the number of grave goods per grave and per burial seem to be the same ([Table 7B](#)). However, this is mostly due to the unusually rich EN Grave 3–1972 from Shamanskii Mys and relatively large number of heavily disturbed LN graves which have very few grave goods. When these graves are excluded from the comparison, the LN graves appear to have almost twice as many grave goods (11.2) as those from the EN (6.1). The counts of grave goods per burial are similar (4.2 vs. 6.2, respectively), a pattern accounted for by the high number of LN graves with multiple interments. The main difference between the two periods is in the number of grave good categories represented, which drops from 30 to 18 for the EN group with the omission of Grave 3–1972 from Shamanskii Mys, relative to 39 categories for the relatively intact Serovo graves ([Table 7A](#)). The EN grave good assemblage is much less diverse than the LN one, which is the reverse of what has been observed in the Angara valley between the EN Kitoi and LN Serovo and Isakovo graves ([Bazaliiskii, 2010](#)). Moreover, the numbers of grave goods in the Little Sea EN and LN graves are much lower relative to their counterparts in the Angara valley.

Combining the LN ([Table 3](#)) and EN ([Goriunova et al., 2020: Table 3](#))

grave good categories into broader groups based on functional criteria facilitates additional comparison ([Table 8](#)). Six such groups, some corresponding to key subsistence activities, have been identified: (1) Bow-and arrow technology (arrowheads, bone arrowheads, and bow stiffeners); (2) Composite tools or weapons (lithic bifaces, prismatic blades and blades, and organic shafts); (3) Knives (of various kinds) for cutting meat, hides etc.; (4) Fishing tackle (harpoons, composite fishhook shanks and barbs, simple fishhooks, fish lures, and fishing reels); (5) Ornaments (boar tusks, red deer pendants, and beads) (6) Ceramic pots; and (7) Other grave goods. It is understood that many of these objects could have served multiple purposes. Objects used for the manufacture of clothes (e.g., perforators, awls, needle boxes, needles, etc.), other tools (e.g., axes, adzes, drills, burins, flakers, abraders etc.), and objects represented by one specimen only (e.g., the EN adze with lugs, the EN spoon/spatula, or the Serovo zoomorphic figurine) are all considered less useful for this exercise and are included in a separate group: Other grave goods.

The first column of [Table 8](#) shows the grave good groups, the next two provide counts of individual grave goods (i.e., objects) included in the group and their frequencies relative to the total number of all grave goods in the dataset. The next two columns provide information about the number of grave good category occurrences in each grave good group taken from the “Total occurrences” line in [Table 3](#), and their frequencies relative to the total number of grave good category occurrences. The last two columns show the number of graves in which a given group of grave goods was recorded and their frequency relative to the total number of grave good group occurrences in the dataset. For example, in the Little Sea-Serovo graves, there are a total of 53 objects included in the “Bow-and-arrow technology” group, which consists of the following 3 categories of grave goods: arrowheads, bone arrowheads, and bow stiffeners ([Table 3](#)).

Table 8
Comparison between Early and Late Neolithic mortuary protocols in the Little Sea microregion: Grave goods, grave good categories, and grave good groups.

Grave good group	Grave goods		Grave good category occurrences		Grave good group occurrences	
	n	%	n	%	n	%
Little Sea, Early Neolithic, all graves						
1 Bow-and-arrow technology	12	9%	3	5%	2	6%
2 Composite tools or weapons	32	23%	13	22%	9	28%
3 Knives	2	1%	2	3%	2	6%
4 Fishing tackle	40	29%	7	12%	4	13%
5 Ornaments ^a	2	1%	6	10%	3	9%
6 Ceramic pots	2	1%	2	3%	2	6%
7 Other grave goods	48	35%	25	43%	10	31%
Totals	138	100%	58	100%	32	100%
Little Sea, Early Neolithic, excl. SHM_1972.003						
1 Bow-and-arrow technology	9	11%	1	3%	1	4%
2 Composite tools or weapons	28	35%	10	29%	8	32%
3 Knives	1	1%	1	3%	1	4%
4 Fishing tackle	9	11%	3	9%	3	12%
5 Ornaments ^a	1	1%	3	9%	2	8%
6 Ceramic pots	1	1%	1	3%	1	4%
7 Other grave goods	30	38%	15	44%	9	36%
Totals	79	100%	34	100%	25	100%
Little Sea, Late Neolithic, all graves						
1 Bow-and-arrow technology	53	17%	16	10%	13	13%
2 Composite tools or weapons	27	9%	9	5%	7	7%
3 Knives	36	11%	26	16%	19	19%
4 Fishing tackle	7	2%	6	4%	6	6%
5 Ornaments ^a	27	9%	12	7%	9	9%
6 Ceramic pots	34	11%	24	14%	24	24%
7 Other grave goods	132	42%	73	44%	24	24%
Totals	316	100%	166	100%	102	100%
Little Sea, Late Neolithic, relatively intact graves						
1 Bow-and-arrow technology	53	17%	16	10%	13	14%
2 Composite tools or weapons	27	9%	9	6%	7	8%
3 Knives	33	11%	23	15%	16	17%
4 Fishing tackle	7	2%	6	4%	6	6%
5 Ornaments ^a	22	7%	9	6%	7	8%
6 Ceramic pots	32	11%	22	14%	22	24%
7 Other grave goods	129	43%	70	45%	22	24%
Totals	303	100%	155	100%	93	100%
Little Sea, Late Neolithic, extensively disturbed graves						
1 Bow-and-arrow technology	0	0%	0	0%	0	0%
2 Composite tools or weapons	0	0%	0	0%	0	0%
3 Knives	3	23%	3	27%	3	33%
4 Fishing tackle	0	0%	0	0%	0	0%
5 Ornaments ^a	5	38%	3	27%	2	22%
6 Ceramic pots	2	15%	2	18%	2	22%

Table 8 (continued)

Grave good group	Grave goods		Grave good category occurrences		Grave good group occurrences	
	n	%	n	%	n	%
7 Other grave goods	3	23%	3	27%	2	22%
	13	100%	11	100%	9	100%

“Grave good category occurrences” and “Grave good group occurrences” are more representative.

^a The “Number of grave goods” not properly reported.

Together, these objects account for 17% of all grave goods ($N = 316$) collected from all examined graves. These 3 categories collectively occurred 16 times (i.e., the sum of the total occurrences for each category is 16; Table 3), which accounts for 10% of all grave good category occurrences ($N = 166$). Lastly, objects representing this group were recorded in 13 graves, that is 13% of all grave good group occurrences ($N = 102$).

With a few exceptions, each object has been counted as a separate item. The first two exceptions regard pottery fragments and bow stiffeners, where the counts represent the number of pots and bows, rather than the number of individual ceramic or stiffener fragments. The next two exceptions regard red deer canine pendants and beads, which in several instances have been reported only as numbering a few, several, or many specimens without providing their exact number (Table 3; Goriunova et al., 2020: Table 3). Due to this under-reporting, “Grave good category occurrences” and “Grave good group occurrences” are more informative variables (Table 8).

Limiting discussion to the main six groups, comparison between EN and LN grave goods reveals similarities and differences between the two mortuary assemblages, which become even more apparent once the EN grave from Shamanskii Mys (Gr. 3–1972) is removed.⁴ The EN assemblage is clearly dominated by “Composite tools and weapons” (35%). “Bow-and-arrow technology” (11%), “Knives” (11%), and “Fishing tackle” (11%), are much less numerous, while “Ornaments” (1%) and “Ceramic pots” (1%) are represented rarely. In contrast, the LN grave good assemblage is more balanced with “Fishing tackle” (2%) represented the least and “Bow and arrow technology” (17%) the most. The numbers characterizing grave goods related to game hunting (“Bow-and-arrow technology” and “Composite tools and weapons”) are reversed between the two chronological groups: “Composite tools and weapons” are much more common in EN graves and “Bow-and-arrow technology” is more common in LN graves. Ceramic vessels are rare in EN graves but common during the LN (a pattern already known previously) and it appears that “Knives” show the same pattern. “Fishing tackle” is more frequent in EN graves even with the exclusion of Grave 3–1972 at Shamanskii Mys, which had the highest number of such objects. Lastly, “Ornaments” are more common among the LN graves.

Whether or not such distinctive emphasis on different categories of material culture for use as grave goods reflects differences in subsistence patterns between the EN Khotoruk–Kurma and LN Little Sea–Serovo groups is an entirely different matter requiring the assessment of other categories of archaeological materials (e.g., faunal remains and biochemical data; cf. Losey and Nomokonova, 2017; Weber, 2020; Weber et al., 2020). It seems clear, however, that (relative to the LN) objects related to hunting with hand-held weapons were more prevalent among EN grave goods than objects related to hunting with the bow-and-arrow. During the LN, on the other hand, objects related to hunting with the bow were much more common and knives and ceramic pots also became more frequent grave good categories, with the pots present in 24 out of 39 LN graves (Table 3).

In sum, relative to the Khotoruk–Kurma group, the Little Sea–Serovo

⁴ The following discussion reports only numbers for the relatively intact LN graves.

assemblage was more diverse and differed in structure: the EN contained more objects related to hunting with hand-held weapons while the LN had more items related to the bow-and-arrow, knives, and ceramic vessels. Both, however, were much poorer and less diverse than the EN Kitoi grave good assemblage on the Angara and Southwest Baikal, Isakovo and Serovo assemblages on the Angara, and even the Serovo assemblage from the Upper Lena.

4. Discussion: Chronology

A few other papers in this special issue (Bronk Ramsey et al., 2020; Schulting et al., 2020; Weber et al., 2020) provide comprehensive background to the current understanding of Cis-Baikal Middle Holocene archaeological chronology based on the radiocarbon dating of human skeletal remains. Consequently, this paper addresses only points directly relevant to the development of the Little Sea–Serovo mortuary tradition focusing on: (1) The chronological position of the Little Sea–Serovo pattern relative to the Khotoruk–Kurma mortuary complex; (2) The chronological position of the Little Sea–Serovo pattern relative to other microregional LN mortuary groups; (3) The synchronicity of Serovo cemetery use within the Little Sea; and (4) Chronological correspondence between Serovo cemeteries and materials from camp sites within the Little Sea. To avoid duplication with the other papers, the discussion will be as succinct as possible.

Currently, there are 50 radiocarbon dates available for graves and burials from 7 of the 9 known Little Sea–Serovo cemeteries (Tables 9 and 10). Most of these determinations ($n = 38$) are on human skeletal remains, with the remaining ones on charcoal, birch bark, wood fragments, or unidentified bone. The dates obtained in Russian laboratories (Table 10; Goriunova et al., 2018) cannot be corrected for the freshwater reservoir effect (FRE) because stable isotope results are not available (Weber et al., 2016). Of the 28 AMS dates from the ORAU laboratory, University of Oxford, 26 determinations

can be FRE-corrected and are analyzed further (Table 9).

To address the points listed above, the following datasets have been analyzed:

- (1) 16 dates representing the Khotoruk–Kurma burials (Weber et al., 2020).
- (2) 24 dates representing the Little Sea–Serovo group excluding, as mentioned earlier, 2 old dates from the Ulan-Khada cemetery because they would undoubtedly skew the results (Table 9). Even though these dates are much older than the rest of the Little Sea–Serovo group there is little doubt that, at the regional scale of analysis, the graves and burials they associate with belong to the LN as the dates fit with the earliest LN Isakovo dates from the Angara and the one Isakovo date from the Upper Lena (see below). Interestingly, these two individuals from Ulan-Khada, as well as the third one with a much younger date (and thus included in this dataset) all show carbon and nitrogen stable isotope values that are consistent with the LN component in the Angara valley, which is currently dominated by Isakovo burials from the Ust'-Ida I cemetery ($n = 36$). This suggests that before arriving in the Little Sea, these individuals spent a considerable amount of time in the Angara valley. Consequently, these three conventional dates have been FRE-corrected using the equation developed for the Angara valley rather than the one used for the Little Sea, which was applied to all other Serovo dates in that microregion (Weber et al., 2020).
- (3) 36 dates representing the Serovo component of the Verkholsk cemetery on the Upper Lena, excluding Grave 19 with an EN date (White et al., 2020) and Grave 13–1951, which shows a burial orientation typical of the Angara–Isakovo mortuary tradition (parallel to the river with the head pointing upstream; Okladnikov, 1978). The date for Grave 13–1951 is also much older than the rest of the Serovo dates from Verkholsk. And,

Table 9

Radiocarbon dates for Late Neolithic Serovo graves in the Little Sea microregion obtained from the ORAU Laboratory, University of Oxford (after Weber et al., 2020).

No.	Cemetery	Master_ID	Age	Sex	OxA No.	Date BP	Date error	Corrected date BP	Corrected error	Cal age BP 95%	Mean Cal date BP	Mean Cal date error	RCombine_Test
1	Budun IV	BUD_2015.007	9–15 m.	U	34548	4653	30	n/a	n/a	n/a	n/a	n/a	
2	Sarminskii Mys	SMS_1986.011A.03	0–7 y.	U	25487	4712	28	n/a	n/a	n/a	n/a	n/a	
3	Ulan Khada IV	UK4_1959.012	50+ y.	M	33952	5500	38	5279	75	6270–5914	6071	93	
4	Ulan Khada IV	UK4_1959.014.02	20+ y.	FP	33953	5495	38	5270	75	6270–5909	6063	94	
5	Ulan Khada V	UK5_1959.001	20+ y.	FP	33956	4865	38	4598	75	5578–5041	5284	143	
6	Shamanskii Mys I	SHM_1976.001.01	20+ y.	U	25127	4902	33	4572	61	5465–5041	5233	127	
7	Sarminskii Mys	SMS_1986.019.05	36–55 y.	F	25569	4781	33	4546	61	5447–4977	5192	113	
8	Sarminskii Mys	SMS_1987.029.02	8–13 y.	U	25571	4871	31	4534	60	5444–4974	5178	107	
10	Sarminskii Mys	SMS_1986.019.01	14–19 y.	M	25567	4846	33	4507	61	5435–4961	5154	105	
9	Sarminskii Mys	SMS_1986.019.03	20+ y.	MP	34507	4877	36	4508	63	5436–4894	5154	108	
11	Sarminskii Mys	SMS_1987.031.03	20–35 y.	FP	34512	4892	35	4458	63	5298–4879	5105	119	
12	Sarminskii Mys	SMS_1987.031.01	30–40 y.	M	34511, 35065	n/a	n/a	4449	45	5288–4880	5100	115	χ^2 -Test: df=1 T=0.3(5% 3.8)
13	Khuzhir-Nuge VI	KN6_2005.006	20+ y.	U	34427	4798	32	4428	61	5287–4865	5065	124	
14	Sarminskii Mys	SMS_1986.017	20–35 y.	M	25566	4680	32	4412	61	5284–4856	5041	124	
15	Sarminskii Mys	SMS_1986.011A.01	8–13 y.	U	25563	4736	33	4363	61	5275–4833	4972	106	
16	Sarminskii Mys	SMS_1986.011A.04	20–35 y.	MP	25488	4747	29	4359	59	5271–4832	4964	100	
17	Sarminskii Mys	SMS_1986.011B.01	20–35 y.	M	35062, 35063	4816	21	4353	56	5262–4830	4952	91	χ^2 -Test: df=1 T=0.0(5% 3.8)
18	Sarminskii Mys	SMS_1987.029.01	20+ y.	M	34510	4793	39	4326	65	5271–4657	4929	102	
19	Sarminskii Mys	SMS_1986.019.02	56+ y.	M	25568	4751	32	4283	61	5039–4627	4851	99	
20	Budun IV	BUD_1986.027A	20+ y.	U	34808	4877	32	4277	61	5038–4620	4838	100	
21	Budun IV	BUD_1986.028.00	20+ y.	FP	34645	4793	29	4230	59	4956–4570	4750	89	
22	Sarminskii Mys	SMS_1986.011A.02	20–35 y.	M	35064	4665	28	4220	59	4872–4569	4738	86	
23	Budun IV	BUD_2015.004	16–17 y.	U	34425, 34426	4757	25	4214	58	4866–4572	4732	84	χ^2 -Test: df=1 T=0.3(5% 3.8)
24	Budun IV	BUD_2015.006	45–50 y.	FP	34549	4801	31	4193	60	4855–4537	4713	85	
25	Elga III	EL3_1988.001	5+ y.	U	34553	4477	30	4151	60	4837–4526	4684	91	
26	Budun IV	BUD_2015.001	40–45 y.	MP	34550	4759	31	4144	60	4837–4523	4678	93	
27	Budun IV	BUD_2015.002	13–16 y.	U	34551	4628	30	4111	60	4827–4445	4649	103	
28	Budun IV	BUD_1986.027B	20+ y.	U	34644	4741	33	4066	61	4815–4421	4594	113	

Dates for individuals whose age could be younger than 5 years were neither corrected for the FRE nor calibrated.

Table 10
Radiocarbon dates for Late Neolithic Serovo graves in the Little Sea microregion obtained from various laboratories.

No.	Cemetery	Grave	Burial	Sample	Lab No.	Date BP	Date error	Cal age BP 95%	Mean cal BP	Mean cal error
1	Elga III	Gr. 3		Human bone	GIN-5840	11,300	130			
2	Elga III	Gr. 5		Human bone	GIN-6841	4460	70			
3	Sarminskii Mys	Gr. 1		Charcoal	GIN-5837	4330	40	5033–4836	4910	50
4	Sarminskii Mys	Gr. 11 A	m.d.	Human bone	GIN-6842	3300	150			
5	Sarminskii Mys	Gr. 11 B		Birch bark	GIN-5598	4430	40	5280–4871	5057	116
6	Sarminskii Mys	Gr. 11 B	m.d.	Human bone	GIN-5599	5500	400*			
7	Sarminskii Mys	Gr. 19		Human bone	GIN-5600	4410	100			
8	Sarminskii Mys	Gr. 19		Birch bark	GIN-5601	5070	130	6179–5587	5827	147
9	Sarminskii Mys	Gr. 19		Charcoal	GIN-5838	4440	50	5285–4874	5082	119
10	Sarminskii Mys	Gr. 29		Human bone	GIN-5602	3840	290			
11	Sarminskii Mys	Gr. 29		Human bone	GIN-6843	5220	140			
12	Sarminskii Mys	Gr. 30		Charcoal	GIN-5603	4420	40	5277–4867	5032	113
13	Sarminskii Mys	Gr. 30		Birch bark	GIN-5604	4400	40	5270–4857	4987	96
14	Sarminskii Mys	Gr. 8	m.d.	Charred bone	GIN-5839	3370	80			
15	Khalurinskii Mys	Gr. 1		Human bone	GIN-7767a	4560	200			
16	Khalurinskii Mys	Gr. 2		Wood	GIN-4557	3110	40			
17	Khalurinskii Mys	Gr. 2		Birch bark	GIN-4819	4300	100	5281–4573	4892	170
18	Kharansa I	Gr. 2–1978		Human bone	GIN-3873	4860	40			
19	Khuzhir-Nuge VI	Gr. 4		Human bone	GIN-5607	4470	40			
20	Khuzhir-Nuge VI	Gr. 4		Birch bark	GIN-5608	800	150	1049–523	766	130
21	Shamanskii Mys I	Gr. 1–1976	1	Charcoal	GIN-1611	4590	90	5580–4975	5264	155
22	Shamanskii Mys I	Gr. 1–1976	1	Charcoal	SOAN-1547	4415	40	5276–4865	5020	109

Only dates that do not require FRE correction are calibrated.

Dates on human bone samples cannot be corrected for the FRE due to the lack of associated stable isotope results. Therefore, they are not calibrated either.

(4) 36 dates representing the LN Isakovo component of the Ust'-Ida I cemetery on the Angara River (Weber et al., 2020).

All four datasets have been analyzed in OxCal 4.2 using an approach developed for the analysis of a much larger regional set of radiocarbon dates (Weber et al., 2020). The approach is based on models assuming the *Trapezium* distribution of dated events, which ensures direct comparability of the results. Since the analysis generates a substantial number of chronological parameters, to keep the matter simple only the mean *Average Start* and *Average End* are referred to in the following presentation of various archaeological boundaries. However, Table 11 presents all chronological parameters, which are further explained in Weber et al. (2020). For additional comparison, the table shows results of two other datasets: the EN Kitoi mortuary tradition from the Angara valley and Southwest Baikal represented by 225 dates and the combined Cis-Baikal LN Isakovo–Serovo group, including the Serovo dates from the Little Sea, with a total of 103 dates.

One interesting aspect of Cis-Baikal Middle Holocene hunter–gatherer culture history is the discontinuity in the use of formal cemeteries, which defines the MN period. The matter has been the subject of research by many scholars within and without the Baikal Archaeology Project and discussed in the West in several generalizing publications (e.g., Weber, 1995; Weber et al., 2002, 2010, 2011, 2016; Weber and Bettinger, 2010) as well as in a large number of technical contributions. Thus far, the discussion has focused mostly on the regional scale of analysis. However, due to the continued radiocarbon dating of human skeletal materials from across Cis-Baikal, a few papers in this special issue (including this study) attempt to assess the matter of mortuary discontinuity from a microregional perspective (e.g., Bronk Ramsey et al., 2020; Weber, 2020; Weber et al., 2020).

Of the four archaeological microregions of Cis-Baikal—the Angara valley, Southwest Baikal, the Little Sea, and the Upper Lena valley—the Little Sea currently has the highest number of graves ($n = 26$) generally parallel to the EN Kitoi tradition of the Angara valley and Southwest Baikal in terms of chronology, but quite different in terms of culture (e.g., Goriunova et al., 2020; Weber, 2020; Weber et al., 2020). This number is still growing due to the continued work at Mys-Uiuga. The analysis of the available radiocarbon dates for the Khotoruk–Kurma and the Little Sea–Serovo groups shows that the MN in the area was roughly 2000 years

long, that is, about as long as in the Angara valley but shifted somewhat towards the younger end (Table 12). Even though the EN Khotoruk–Kurma group appears to start significantly before the formation of the Kitoi pattern, it ends somewhat later. The Little Sea–Serovo group seems to start much later than the Isakovo group in the Angara valley.

This raises the question of microregional variation in the chronology of LN mortuary traditions. The number of ^{14}C dates available for the Angara–Isakovo, Upper Lena–Serovo, and Little Sea–Serovo units are about the same so results should be generally comparable (Table 11). However, the numbers of dated cemeteries are obviously different and this may somewhat bias the results. Since the Angara–Serovo group is currently represented by only a few dates (Weber et al., 2020), this unit is omitted from further analysis. Overall, while the Angara–Isakovo and the Upper Lena–Serovo groups appear to be roughly chronologically parallel to one another, the Little Sea–Serovo group seems to be much younger than the other two, both in terms of its beginning and end (Tables 11 and 12). Keep in mind however, that two unusually old dates from Ulan-Khada have been excluded from the current analysis. If future work bridges the gap between them and the rest of the Little Sea–Serovo dates, this may indicate that the Serovo mortuary tradition indeed started there around the same time as elsewhere. If so, this will also reduce the duration of the MN in the Little Sea. The timing of the end of the Serovo tradition is a different matter, however. That the Little Sea–Serovo ended much later than either the Angara–Isakovo or the Upper Lena–Serovo groups is supported by transitions to the EBA mortuary pattern which are rather well-dated in all three microregions (Weber et al., 2020).

Only two Little Sea cemeteries—Sarminskii Mys and Budun IV—have enough radiocarbon dates to assess the timing of their use relative to one another. Since this matter is the subject of a separate examination (Bronk Ramsey et al., 2020), it will suffice here to say that most likely these two cemeteries were not used at the same time. Sarminskii Mys clearly is much older, whereas Budun IV is younger and very close to the LN–EBA boundary in the Little Sea (Weber et al., 2020). Furthermore, Budun IV represents a much shorter time interval, which is partly driven by the four dates coming from the same grave (Gr. 1–2015) of seven burials, likely representing a single event. This is consistent with the results of an examination of a much larger set of dates for a few dozen cemeteries of varying size, representing the entire Cis-Baikal, which show markedly variable timing of cemetery use across all relevant

Table 12
Chronology of Early and Late Neolithic mortuary traditions examined in the paper: Summary of main parameters.

Boundaries	Early Neolithic mortuary traditions			
	Little Sea Khotoruk–Kurma	Angara & SW Baikal Kitoi		
Average Start	8137 ± 154	7525 ± 15		
Average End	7256 ± 97	7042 ± 32		
Boundaries	Late Neolithic mortuary traditions			
	Little Sea Serovo	Upper Lena Serovo	Angara Isakovo	Cis-Baikal Isakovo–Serovo
Average Start	5197 ± 85	5504 ± 44	5465 ± 47	5713 ± 44
Average End	4664 ± 76	5041 ± 73	5355 ± 42	4889 ± 62

archaeological periods and microregions (Bronk Ramsey et al., 2020).

Lastly, using the chronological estimates for *Average Start* and *Average End* as guidelines, the Little Sea–Serovo group dates to between 5197 ± 85⁵ and 4664 ± 76 cal. BP, which is consistent with dates for the corresponding LN archaeological assemblages from camp sites within the Little Sea microregion. The dataset of 15 AMS dates obtained recently for herbivore bone fragments and charcoal range from 5590 to 4630 cal. BP (Goriunova and Novikov, 2018). Since the first interval is modelled while the second is not, and the first group of dates represents sealed archaeological contexts while the second does not, the two intervals are considered relatively consistent with one another, a notion likewise supported by the rest of the Little Sea–Serovo chronological parameters (Table 11).

5. Conclusion

The Little Sea–Serovo mortuary protocol shows relatively limited variation. Mortuary characteristics that are most common to this group include stone structures (on the surface and inside the grave pits); extended supine body position; a generally northern head orientation; pit-fires—frequently resulting in partial cremation of the human skeletal remains; sheets of birch bark covering the burials; graves with multiple bodies arranged in layers; and the prevalence of objects related to bow-and-arrow technology and ceramic pots among the grave goods. On the other hand, body position on the side with flexed legs, secondary interments, vertical head stones, red ochre stains, and fishing gear are all rare.

To be sure, many of these characteristics link the Little Sea–Serovo with the Serovo tradition in the Angara and Upper Lena valleys, which have also been well-documented. Stone structures (on the surface and in the grave pits), extended supine body position, and graves with multiple burials are all known from the Angara valley, with additional similarities in the assortment and morphology of many grave goods. On the other hand, the Little Sea–Serovo differs from the Angara–Serovo in the use of pit-fires and sheets of birch bark to cover the dead, the layered arrangement of interments, and the orientation of the dead (relative to cardinal directions).

Affinities with the Upper Lena–Serovo include essentially the same characteristics that are shared with the Angara–Serovo, including stone structures, extended supine body position, and graves with two or more interments. Similarities even extend to a few other mortuary characteristics such as the layered arrangement of burials, pit-fires, and sheets of birch bark—all three, however, occurring less frequently than in the Little Sea—as well as the common presence of ceramic vessels among grave goods and the occasional small stains of red ochre. Differences mostly involve the morphology of some of the grave goods. Thus, the links with the Upper Lena–Serovo appear to be even stronger than with the Angara–Serovo.

Overall, while the Serovo mortuary tradition in the Little Sea does show a few local idiosyncrasies, the prevailing picture is one of many similarities linking all three microregions. It can be even argued that body orientation is

the same everywhere, if it is considered relative to the main body of water rather than in terms of cardinal directions: in all three microregions the legs point generally towards the water and the heads away from it, whether that water is Lake Baikal or the Angara or Lena river. Since in the Little Sea the lake is roughly located to the south, this results in the heads generally pointing north. Perhaps, then, there are only four characteristics that make the Little Sea–Serovo mortuary protocol different from the other two microregions: (1) The frequent use of pit-fires—absent on the Angara and rare on the Upper Lena; (2) The shape and decoration of ceramic pots; (3) The generally poor assemblage of grave goods; and (4) The presence, albeit rare, of burials placed on their side with flexed legs.

That similarities in Serovo mortuary protocols exist between these three microregions is neither surprising nor novel, as already pointed out by several scholars (e.g., Bazaliiskii, 2010; Goriunova, 1997; Konopatskii, 1982; Okladnikov, 1978). However, similarities between the Little Sea–Serovo and the much older Little Sea EN Khotoruk–Kurma group have thus far been neither systematically assessed nor appreciated. The broad range of these similarities is quite surprising. They include architectural characteristics (surface and grave pit stone structures), the number of burials per grave (from single to multiple), their placement (mostly extended supine but sometimes on the side or with flexed legs) and orientation (heads usually pointing north or away from the lake), and a generally poor assemblage of grave goods, frequently with utterly non-diagnostic objects such as drills, perforators, burins, scrapers, flakers, flakes and blades of various kinds, or ornaments.

To be sure, differences between the two periods exist as well and most diagnostic among these, perhaps, are the shanks of composite fishhooks of the Kitoi style—recorded in a few graves of the Khotoruk–Kurma group and unambiguously EN in age, the pit-fires—known only from Serovo graves where they are quite prevalent, and ceramic pots—rare in EN graves while common in Serovo graves and stylistically different from the EN vessels. There are other differences but, since they occur rarely or are visible only at the higher level of a broader comparison (i.e., relative frequencies of various grave goods), they can hardly be considered reliable diagnostic features at the level of individual grave classification. The rare objects involve several categories of grave goods examined here, including bow stiffeners—lacking so far from the Khotoruk–Kurma graves, though known from contemporary EN Kitoi graves on the Angara and Southwest Baikal and also, albeit rarely, from Little Sea–Serovo graves; the adze with “lugs”—known only from one EN grave; the bearskin-shaped tablet—recorded only in one Serovo grave; and several other objects. The only exception is the use of the head-to-toe arrangement of burials which, while rare among the EN Kitoi graves and recorded only in one grave from the Khotoruk–Kurma group, has never been documented in any of the LN or EBA graves even though both periods have yielded numerous graves with multiple interments. On the other hand, the toe-to-toe placement of the dead as in the EN Grave 2 at Khonkhoiskaia Guba does not have analogies anywhere else within the entire Cis-Baikal. Lastly, extensive disturbances are common among the Little Sea–Serovo graves but lacking so far among the Khotoruk–Kurma graves.

In sum, in the absence of the very few key diagnostic characteristics listed above, typo-chronological classification of EN and LN graves in the Little Sea is and will remain difficult, and requires radiocarbon dating to sort out conclusively. That these two groups are separated from one another by a considerable amount of time is quite helpful in this regard.

The chronology of both LN microregional mortuary groups, Isakovo and Serovo, still requires more radiocarbon dates. Sample sizes are rather small, heavily biased towards two cemeteries—Ust’-Ida I for the Angara–Isakovo and Verkholsk for the Upper Lena–Serovo, and there are only a few dates for the Angara–Serovo. The available radiocarbon evidence suggests that while all these LN mortuary groups existed for some time parallel to one another, their beginning and end in each microregion could have been somewhat different. The strongest evidence seems to indicate that the Little Sea–Serovo group lasted much longer than either the Angara–Isakovo or the Upper–Lena–Serovo group. If the gap between the two old LN dates from Ulan-Khada and the rest of the Little Sea–Serovo dates remains as is, then the start of this group will be quite late relative to the other groups as well. If the

⁵ Italics denote modelled dates.

gap fills in, the start of all LN microregional mortuary groups will turn out to be essentially the same. Either result will have a significant bearing on our understanding of the history of LN cultural patterns across Cis-Baikal.

Author statement

1. The paper has been originally researched and written in Russian by O.I. Goriunova and A.G. Novikov based on published papers, field-work reports, and own materials.
2. All radiocarbon dating done at the University of Oxford was paid by the Baikal Archaeology Project supported by grants from the Social Sciences and Humanities Research Council of Canada.
3. The paper was next discussed with A.W. Weber and accordingly revised after which it was translated to English also by Weber.
4. After translation, Weber further revised and reorganized the paper and, after approval of the Goriunova and Novikov, it was submitted to ARA.
5. After reviews, the paper was revised by Weber upon consultation with Goriunova and Novikov and resubmitted to ARA after approval by all authors.

Declaration of Competing Interest

None.

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