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K.Y. Kiryushin[1], Y.F. Kiryushin[1], K.N. Solodovnikov[2], Y.V. Frolov[1], and A.V. Schmidt[3]

[1]Altai State University,
Pr. Lenina 61, Barnaul, 656049, Russia
E-mail: kirill-kirushin@mail.ru; frolov_jar@mail.ru
[2]Institute of Northern Development, Tyumen Scientific Center,
Siberian Branch, Russian Academy of Sciences,
Malygina 86, Tyumen, 625026, Russia
E-mail: solodk@list.ru
[3]Museum of Nature and Man,
Mira 14a, Khanty-Mansiysk, 628011, Russia
E-mail: tison172@mail.ru

Results of Radiocarbon Dating of Early Burials in the Firsovo Archaeological Area, Barnaul Stretch of the Ob

An especially noteworthy part of the Firsovo archaeological area is a group of early burials at the flat-grave cemeteries Novoaltaisk-Razvilka, Firsovo XI, and Firsovo XIV. Nine radiocarbon dates have been generated for those cemeteries at various laboratories: two by the liquid-scintillation (LSC) method and seven using the accelerator mass spectrometry (AMS) method. The dates were calibrated using OxCal version 3.10 software. Dates for the Chalcolithic Bolshoy Mys culture burials at Novoaltaisk-Razvilka and Tuzovskiye Bugry-1 burial 7 match the previously suggested ones (around 3000 BC). Certain Neolithic burials in the Altai differ from others in the position of the bodies (flexed on the side). They were dated to the late 5th to the early 4th millennia BC by the AMS method. Burials belonging to the "cultural core" of Firsovo XI, then, fall within the Early Neolithic (68 % interval, 5710–5460 BC; 95 % interval, 5740–5360 BC). The date 9106 ± 80 BP (GV-02889), obtained for Firsovo XI burial 18, may be somewhat accurate, pointing to the Final Mesolithic or Early Neolithic. Both the date and the cultural characteristics of this burial (sitting position, abundant ocher) are accompanied by the craniometric distinctness of the male cranium (huge total size).

Keywords: *Flat-grave burial ground, Final Mesolithic, Early Neolithic burial, Middle Neolithic, Chalcolithic.*

Introduction

The Firsovo archaeological area (hereafter, the FAA) is located on the right bank of the Ob River, opposite the city of Barnaul. It stretches out in a narrow strip along the low bedrock bank of the Ob for about 15 km from the southern outskirts of Novoaltaisk to the village of Lesnoye. The village of Firsovo, around which the majority of the known sites in the district are concentrated, is in the center of this area, located between two woodlands on the main part of the right bank region of the Ob River. A steppe section joints the Ob River in that area, optimally combining conditions favorable both for appropriating (hunting and fishing) and producing (cattle breeding and agriculture) economies. The bank of the Ob River in this place is a

wide (up to 7 km) swampy floodplain with many oxbow lakes, which are interspersed with low wooded ridges and residual hillocks of the valley wall. The vegetation is of the meadow type, with thickets of shrubby willows, aspens, and birches. During floods, the water in the Ob River rises by 1.5–3.0 m, almost completely flooding the floodplain and coming close to the valley wall upon which the sites are located.

In the late 1970s to early 1980s, A.L. Kungurov, V.B. Borodaev, and A.B. Shamshin discovered over twenty sites in the main core of the FAA (Kungurov, 2006: 346). From 1984 to 1997, excavations at several reference archaeological sites were conducted by Shamshin, which allowed him to sum up the information on the Bronze Age of the area (Ibid.: 347–352). The FAA is unique because of the concentration of over twenty sites from the Neolithic to the Middle Ages in a limited area. Nine large sites, many of which are multi-layered complexes of different periods, have been excavated over large areas. A group of Stone Age and Chalcolithic burials at the flat-grave cemeteries of Novoaltaisk-Razvilka, Firsovo XI, and Firsovo XIV is of particular interest (Fig. 1).

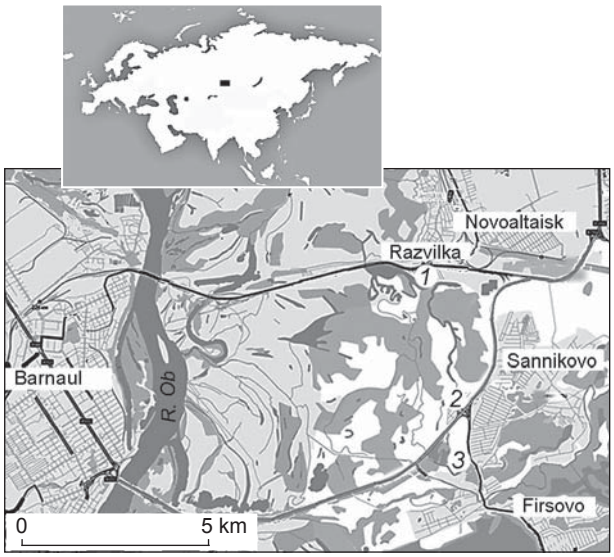

Fig. 1. Flat-grave cemeteries of Novoaltaisk-Razvilka (*1*), Firsovo XI (*2*) and XIV (*3*).

Research results

The **Novoaltaisk-Razvilka** flat-grave cemetery was discovered in 2005 in Novoaltaisk, on Repnina Street, in the precipice of the floodplain terrace on the right bank of the Ob River. Burial 2 was found at a depth of 0.42 m from the present-day surface. The grave spot was not visible. In the course of excavations, an incomplete skeleton of a 15–16-year-old boy buried in an extended supine position (with arms along his body), with his head to the north, was unearthed. The grave goods included stone and bone items: a pendant made of a badger tusk with a hole drilled in the root, a bird bone, a ribbed spall, a flake, rectangular ornaments made from shells of large river mollusks, a polished stone chisel, an animal vertebra, beaver incisors, and an ornamented needle-case made of radial bird bone. Trace analysis of the bird bone revealed that ornamentation was made with a metal knife used as burin (Kiryushin et al., 2006: 224). During the unearthing, a fragment of Bolshoy Mys pottery decorated with imprints of a smooth rocking stamp (Ibid.: Fig. 1, *6*) was found at the level of the grave spot to the east of the skeleton. Two radiocarbon dates were obtained from the bones of the person from burial 2. The date of 5000 ± 150 BP (Le-7425) was obtained in the Radiocarbon Laboratory at the Institute for the History of Material Culture of the RAS (IHMC RAS), and the date of 4525 ± 95 BP (SOAN-6863) was obtained in the Laboratory of Cenozoic Geology and Paleoclimatology at the Institute of Geology and Mineralogy of the SB RAS (IGM SB RAS).

At **Firsovo XI**, eight burials were discovered, which were originally attributed to the Bolshoy Mys culture of the Chalcolithic (Kiryushin, 2002): five single, two paired, and one collective. The depth of the graves ranged from 0.4 to 1.7 m. The deceased were placed with their heads to the north and northeast. This study analyzes four burials, from which samples for radiocarbon dates were taken (see *Table*).

Grave 14 was the richest burial at this necropolis. It partially disturbed burial 15. The grave spot was not visible. The bones of two people placed "shoulder to shoulder" were found at a depth of 0.8 m from the present-day surface. Skeleton 1 belonged to a male (age 20–30), and skeleton 2 presumably to a young female (age 18–20). The skeletons were poorly preserved. Both of the deceased were buried in an extended supine position, with their heads to the north, with their right hand palms down lying along the bodies, and the left hand palms up over their pelvises. The grave goods included numerous bone and stone items. Sewn-on animal teeth with holes drilled in the roots covered most of the skeletons (Shmidt, Shamshin, 2018: 60–63). The date of 7222 ± 82 BP (GV-02887) was obtained from the fragment of the ulna of skeleton 1 at the Center for Collective Use of the Accelerator Mass Spectrometry (AMS) Complex at the Novosibirsk State University, Novosibirsk Scientific Center (hereafter, CCU AMS NSU–NSC). The radiocarbon age of the samples with the GV index was established using the AMS complex of the Budker Institute of Nuclear Physics of the SB RAS.

The grave spot of burial 15 was not visible. A collective burial of three individuals placed in a supine extended position, with their heads to the east-northeast,

Radiocarbon dates of the samples from early burials at flat-grave cemeteries of the Firsovo archaeological area

Site	Dating method	Sample code	Radiocarbon age, BP	Calendar date, BC		Laboratory
				1σ	2σ	
Novoaltaisk-Razvilka, burial 2	LSC	SOAN-6863	4525 ± 95	3370–3080	3550–2900	IGM SB RAS
	"	Le-7425	5000 ± 150	3960–3650	4250–3500	IHMC RAS
Firsovo XIV, burial 267	AMS	NSKA-01942	6166 ± 96	5230–4980	5320–4840	CCU AMS NSU–NSC
	"	IGAN-5831	6100 ± 25	5055–4980	5080–4930	IG RAS
Firsovo XI, burial 15, skeleton 1	"	UBA-22954	6684 ± 39	5640–5605 5595–5569	5670–5520	^{14}Chrono Centre
Ditto, skeleton 3	"	GV-02888	6723 ± 68	5710–5610 5590–5560	5740–5510	CCU AMS NSU–NSC
Ditto, burial 42, skeleton 1	"	GV-02890	6534 ± 72	5570–5460	5630–5360	"
Ditto, burial 14, skeleton 1	"	GV-02887	7222 ± 82	6210–6130 6120–6010	6250–5970	"
Ditto, burial 18	"	GV-02889	9106 ± 80	8440–8240	8600–8200	"

at a depth of 0.8 m from the present-day surface, was explored. It was partially destroyed by burial 14. The anatomical order of the bones in skeletons 1 and 3 was disturbed.

Skeleton 2 (male, age 45–55) was located in the center. The left hand of the buried person almost completely covered the right hand of individual 1. The bones of the forearm and of the hands of both arms were placed on the pelvic and femur bones. Skeleton 1 (far right) was incomplete: the skull and left humerus had been lost. For this reason, and because of poor preservation of bone substance, the sex and age of that individual have not been established. Skeleton 3 (male, age 55–65 (?)) was on the far left. The elbow joint of the left arm lay on top of the bones of the right arm of skeleton 2; the forearm was placed on the pelvic bones. The grave goods included one arrowhead found on the left femur of skeleton 2. That artifact had triangular shape and a notch at the base (Shmidt, Solodovnikov, 2019: 388–389).

Two radiocarbon dates were obtained from the bones of burial 15. The date of 6684 ± 39 BP (UBA-22954) (Motuzaite Matuzeviciute et al., 2016: Tab. 1) was obtained from the sample of skeleton 1 at the ^{14}Chrono Center for Climate, Environment, and Chronology at the Queen's University in Belfast (Great Britain), and the date of 6723 ± 68 BP (GV-02888) was obtained from the sample of skeleton 3 at the CCU AMS NSU–NSC.

Grave 18 occupied the extreme southeastern position in the second row. The deceased (male, age 35–45) was buried in a sitting position, with his back towards the north. His skull with the occipital bone upward was at a depth of 0.5 m from the present-day surface. The bottom of the burial was unearthed to the level of –1.0 m. The legs of the deceased were bent at the knees and piled on the left side; his feet were joined together; his arms were bent at the elbows; the left forearm rested on the stomach, and the right forearm was extended along the wall of the grave with the hand towards the feet. The grave goods included one microlithic blade found near the bones of the left hand. The burial was abundantly sprinkled with ocher. The date of 9106 ± 80 BP (GV-02889) was obtained from a fragment of the ulna of the skeleton at the CCU AMS NSU–NSC.

The remains of two people buried in an extended supine position, with their heads to the north-northeast, were found at a depth of 0.7 m from the present-day surface, during unearthing of grave 42. The arms of the deceased were extended and placed on the torso; the knees were brought together. Skeleton 1 belonged to a male (age 45–55). The grave goods included artifacts made of stone and bone, as well as sewn-on animal teeth with the holes drilled into the roots. Skeleton 2 belonged to a female (?) (age 40–50). Its grave goods included eight arrowheads made of stone, two small stone axes, and a bracelet made of the split incisor of a large beaver. From the fragment of the ulna of skeleton 1, the date of 6534 ± 72 BP (GV-02890) was obtained at the CCU AMS NSU–NSC.

The **Firsovo XIV** flat-grave cemetery is located 1 km north of the village of Firsovo, on the promontory ledge of the terrace, rising 3 m above the level of the Ob River floodplain. An oxbow of the Ob River is nearby. Since 1987, archaeological excavations under the supervision of Shamshin have been carried out there for several years.

During the years of research, over three hundred burials of the Middle Bronze Age and Early Iron Age have been studied at that site.

A single Neolithic burial (burial 267) was excavated at the necropolis in 1996. The grave spot was not visible. The bones were found at a depth of 0.4 m from the present-day surface, in yellow sandy loam. The skeleton lying in anatomical order belonged to a male (age 55–60). The deceased was buried in a flexed position on his right side, with his head towards the northeast. A bone point, a small horn spatula, fragments of horn rod and bone harpoon, flake, an abrasive tile, and a stone polished knife were found in the grave (Kiryushin, Shamshin, Shmidt, 2013).

Sample preparation of bone evidence from burial 267 for radiocarbon analysis was carried out in the Center for Collective Use "Laboratory of Radiocarbon Dating and Electron Microscopy" at the Institute of Geography of the Russian Academy of Sciences (IG RAS); the measurement of the evidence was performed at the Center for Applied Isotope Studies at the University of Georgia, USA (outsourcing). The date obtained was 6100 ± 25 BP (IGAN-5831). Another date of 6166 ± 96 BP (NSKA-01942) from a sample of the same bone was established in the CCU AMS NSU–NSC.

Discussion

As is known, the discrepancies between the radiocarbon age of burials and their calendar age are associated with the selection of samples for dating (human bone, animal bone or horn, coal, carbon deposits on pottery, etc.). For the burials under consideration, all measurements were made using human bones, which makes it possible to minimize the possible scatter of the dates. Nine radiocarbon dates have been obtained in different laboratories from the samples taken in the early FAA burials: two dates using the LSC method and seven dates using the AMS method. For establishing the calendar age, they were calibrated using the OxCal software (version 3.10) created in Oxford (see *Table*).

Finding a pottery fragment decorated with imprints of smooth rocking stamp (Kiryushin et al., 2006: Fig. 1, *6*) at the level of the grave spot has made it possible to attribute burial 2 of the Novoaltaisk-Razvilka cemetery to the Bolshoy Mys culture (Ibid.: 223). The radiocarbon dates for this burial were 4525 ± 95 BP (SOAN-6863) and 5000 ± 150 BP (Le-7425) and showed a relatively large spread. The intervals of the calendar age established by calibration were 3370–3080 BC (1σ) and 3350–2900 BC (2σ) in the former case, and 3960–3650 BC (1σ) and 4250–3500 BC (2σ) in the latter case, and did not have the overlapping chronological ranges (Fig. 2). This certainly raises doubts about the objectivity of the dating and requires explanations, which may be several. It has already been mentioned in the literature that "no correction for isotopic fractionation was made during analyzes in the laboratories of St. Petersburg (Le) and Novosibirsk (SOAN). In modern AMS laboratories, this correction is mandatory; it usually results in an earlier date, which can be observed in the evidence of the Afanasyevo culture of the Altai" (Polyakov, Svyatko, Stepanova, 2019: 185).

Studies demonstrate that even the use of the AMS method does not make it possible to reach definitive conclusions on the age of the burials of the Bolshoy Mys culture. The most illustrative example is the results of the dating of burial 7 at the Tuzovskiye Bugry-1 flat-grave cemetery using this method. The filling of the grave contained the fragments of a thin-walled vessel decorated with the "stepping comb" pattern typical of the pottery from the habitation complexes of the Bolshoy Mys culture in the Barnaul-Biysk Ob region (Kiryushin Y.F., Kiryushin K.Y., 2015: 61, Fig. 6, *1*). Two AMS dates were obtained from a fragment of the radius of the person buried in this grave, and had a relatively wide scatter: 5005 ± 25 BP (IGAN-5832) and 5409 ± 93 BP (NSKA-01943). The following intervals of calendar age were established: 3800–3710 BC (1σ) and 3810–3700 BC (2σ) in the former case, and 4350–4220 BC (1σ) and 4450–4030 BC (2σ) in the latter case.

Two out of four of the above dates (two dates were obtained by the LSC method, and other two using the AMS method) had overlapping intervals, which made it possible to establish the radiocarbon and calendar age of the above-mentioned burials of the Bolshoy Mys culture as the boundary between the 4th and 3rd millennia BC (3800–3700 BC). The results obtained closely match the previously proposed chronological framework of this culture (Kiryushin Y.F., Kiryushin K.Y., 2019: 106).

The calibration of the two AMS dates for burial 267 of Firsovo XIV—6166 ± 96 BP (NSKA-01942) and 6100 ± 25 BP (IGAN-5831)—gave similar intervals of calendar age: 5230–4980 BC (1σ) and 5320–4840 BC (2σ) in the former case, and 5055–4980 BC (1σ) and 5080–4930 BC (2σ) in the latter case. Thus, that burial can be dated to the late 5th millennium BC, and its calendar age is 5055–4980 BC according to 1σ, and 5080–4930 BC according to 2σ. It can be concluded that the chronological gap between that burial and the Bolshoy Mys burials was at least a thousand years (Fig. 2).

Specific features of the funeral rite (position on the right side, legs bent at the knees and pressed to the body, arms bent at the elbows and pressed to the body) distinguish burial 267 at Firsovo XIV among other early burials of the FAA and the Barnaul-Biysk Ob region as a whole. Its parallels can be found among the evidence from the Solontsy-5 flat-grave cemetery (burials 2 and 3) (Kungurova, 2005: 97). The radiocarbon date

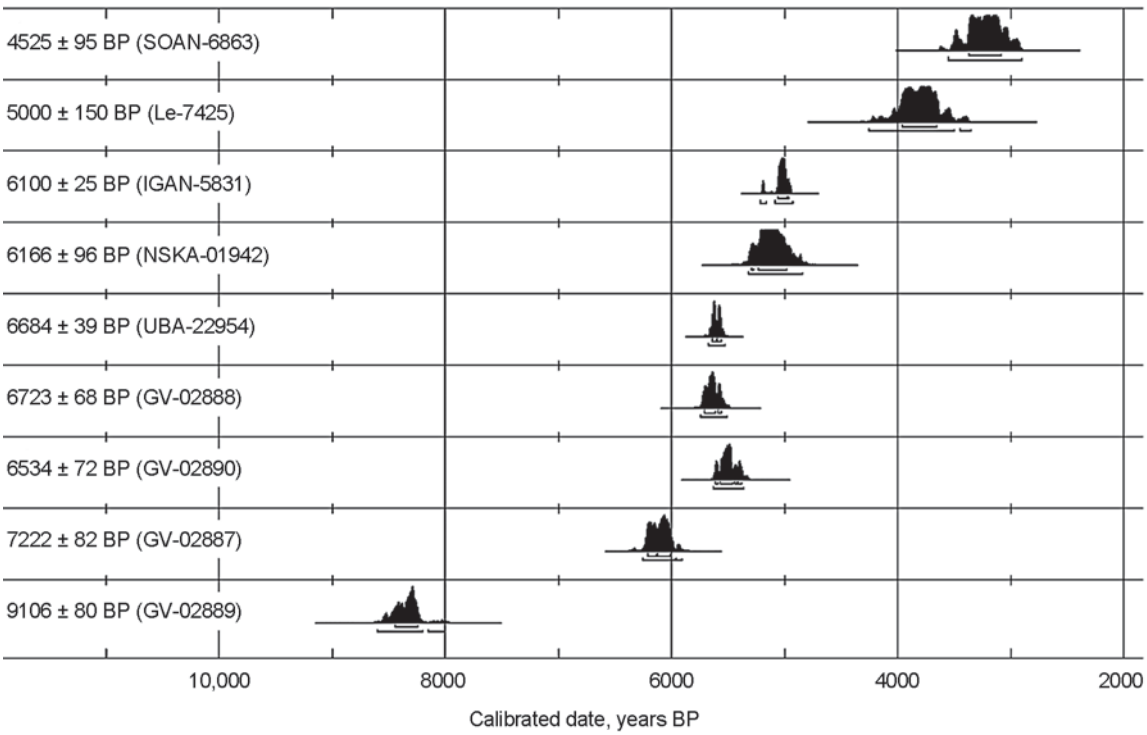

Fig. 2. Summarized radiocarbon dates for the early burials of the FAA flat-grave cemeteries.

of 5810 ± 110 BP (COAH-4947) was obtained for burial 3 (Ibid.: 57), which is quite close to the results of burial 267 at Firsovo XIV. The calibration of that burial gives the intervals of the calendar ages of 4800–4530 BC (1σ) and 4950–4350 BC (2σ). Although the evidence at our disposal is extremely fragmentary, it seems that we can still speak about identifying a small group in the composition of the early Altai burials, which differs from the general number of burials in the features of funeral rite and radiocarbon age. There are reasons to believe that this group may become more numerous over time. Fourteen burials were explored at the Ust-Isha burial ground; eleven burials were attributed to the Neolithic, and one to the Scythian period (Kiryushin, Kungurova, Kadikov, 2000: 9). The cultural and chronological affiliation of two graves without funeral inventory has not been established. One of the graves contained the skeleton of a male buried in a flexed position on his left side, with his head towards the north-northwest (Ibid.: 10; Fig. 3, *2*); in another grave, the deceased was placed on his back with his legs bent at the knees and head towards the west-northwest. The funeral rite of the former individual shows some similar features (flexed position on the side) and differences (orientation of the deceased) with burial 267 at Firsovo XIV. The radiocarbon dating of these burials at the Ust-Isha cemetery is needed. The results obtained will make it possible to confirm or refute the suggestion of their Neolithic age.

Burials 14, 15, and 42 from Firsovo XI are included in the so-called core of the site, and the results of their radiocarbon dating should be considered separately from grave 18. Three out of four dates of these burials were almost the same: 6723 ± 68 BP (GV-02888), 6684 ± 39 BP (UBA-22954), and 6534 ± 72 BP (GV-02890). The fourth date of 7222 ± 82 BP (GV-02887) falls out of the general range and contradicts the planigraphic observations made during the excavations (burial 14 cut through a part of burial 15 and therefore should be dated to a later time). A representative complex of items found in burial 15 (Shmidt, Shamshin, 2018: 60–62), leaves no doubts about its cultural sameness with evidence from burials 16, 17, 41, and 42, which constitute the "cultural core" of the site. Some traditions are very distinctive (processing of animal teeth in manufacturing personal adornments), and their preservation for almost a thousand years is unlikely. At this stage of the study, the date of 7222 ± 82 BP seems to be somewhat too early. The reasons for the discrepancy (specific features of the diet of the buried person or the imperfection of the dating method) still remain to be clarified.

Thus, we can conclude that the burials that constitute the "cultural core" of the site belong to the Early Neolithic (mid fifth millennium BC), and their calendar age fits into a very narrow chronological interval of several decades (5570–5560 BC according to 1σ and 5630–5510 BC according to 2σ) or centuries (5710–5460 BC according

to 1σ and 5740–5360 BC according to 2σ). Even the maximum values give a very short period of three and a half centuries (see *Table*). It can be unambiguously concluded that these burials are among the earliest at the Neolithic burial grounds not only in the Altai, but also in the entire south of Western Siberia. The chronological gap between them and burials similar to those explored at Firsovo XIV (burial 267) and Solontsy-5 (burials 2 and 3) is about 300–500 years (Fig. 2).

On the basis of calibration of the date obtained for burial 18 of the Firsovo XI cemetery (9106 ± 80 BP, GV-02889), the intervals of the calendar age—8440–8240 BC (1σ) and 8600–8200 BC (2σ)—have been established. Thus, the radiocarbon age of that burial is the early 7th millennium BC, while the calendar date makes it possible to attribute it to the mid–second half of the 9th millennium BC. Judging by the results obtained, burial 18 at Firsovo XI belongs to the Mesolithic and it is one of the earliest Holocene burials in Russia and the neighboring countries. Unfortunately, only one date is presently available for that burial, which certainly does not allow for any final conclusions.

Grave 18 at Firsovo XI was one of a few Early Holocene burials on the territory of Russia, where the deceased was buried in the sitting position. Similar Neolithic burials have been found in the Transbaikal region, as well as eastern and southern Cis-Baikal region (Lbova, Zhambaltarova, Konev, 2008: 105, 222) and Eastern Mongolia (Derevianko, Okladnikov, 1969: 151–152; Lbova, Zhambaltarova, Konev, 2008: 131–133). The radiocarbon date of 5590 ± 120 BP (Gif-10949) was obtained for the Tamtsag-Bulak burial (Eastern Mongolia), and 6090 ± 100 BP (SB RAS-5701) for the burial from Petropavlovka (southern Cis-Baikal region) (Lbova, Zhambaltarova, Konev: 133–134, 222). Burials in the sitting position, densely covered with ocher, have been found during the study of the Karavaikha site (the Kargopol archaeological culture) (Bryusov, 1952: 131–132). There is a representative series of dates for the Mesolithic sites of the taiga belt of Western Siberia. It has been observed that "the chronology of the Mesolithic sites… is established as the period of 9500–6700 BP, while the dates earlier than 7000 BP can be considered controversial" (Molodin et al., 2018: 48).

Natural scientific research may reveal some information on the relative chronology of the burials at Firsovo XI. A special study has focused on paleoanthropological evidence from the early graves of that cemetery (Solodovnikov, Tur, 2017). Statistical analysis has revealed the main trends in the intragroup morphological variability of the population that left that necropolis. According to the first main component, the cranium of a male from burial 18 at Firsovo XI stands out among the skulls of other adults buried at that cemetery owing to large total dimensions of its brain case. The second main component distinguishes two male skulls found in grave 15 from the main group according to the structure of the brain capsule and overall size of the face (Ibid.: 65–66, fig. 6).

In a study on stable isotopes of carbon and nitrogen in paleoanthropological and osteological evidence of the Neolithic and Bronze Age from the basins of the Upper Ob and Tobol Rivers (Motuzaite Matuzeviciute et al., 2016), the $\delta^{13}C$ and $\delta^{15}N$ values in the collagen of bones of adults from different Neolithic and Chalcolithic cemeteries of southwestern Siberia were analyzed (Ibid., SOM 1b, available online). In the context of the chronology of Firsovo XI, the observations such as consolidation of a group according to the shares of heavy carbon and nitrogen isotopes in comparison with samples from other cemeteries, absence of sex differences, similarities in the isotope profiles of individuals from a single grave, and the lowest $\delta^{13}C$ values among other Altai populations are important (Fig. 3). The reasons for the latter are probably associated with manifestations of the isotopic background and changes in the share of vegetation of types C_3 and C_4 in the feeding landscape (forest – northern forest-steppe – southern forest-steppe), differences in the content of carbon isotopes in the procured animals resulting from the canopy effect, as well as variation in the share of plant foods. In this regard, a decrease in $\delta^{13}C$ values in anthropological evidence from the Neolithic–Chalcolithic cemeteries of the Altai in the direction from south to north can be observed. The exception is the Ust-Isha burial ground located to the south of the remaining cemeteries: its samples also exhibited higher $\delta^{15}N$ values as compared to most other samples (Fig. 3). The reason

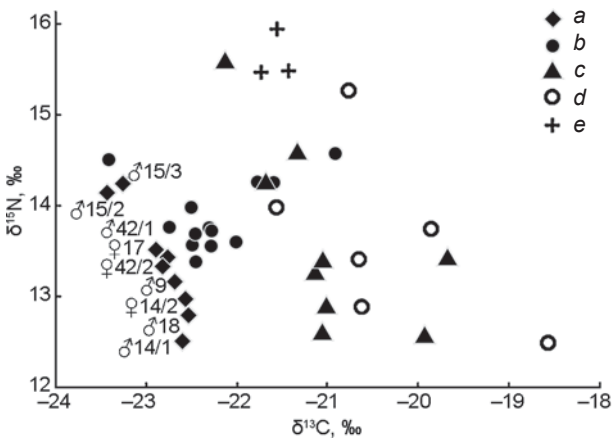

Fig. 3. Individual values of carbon ($\delta^{13}C$) and nitrogen ($\delta^{15}N$) stable isotopes in anthropological evidence from the Neolithic–Chalcolithic cemeteries of the Altai.
a – Firsovo XI (sex of the deceased, as well as numbers of graves and skeletons, are indicated); *b* – Tuzovskiye Bugry-1; *c* – Itkul (Bolshoy Mys); *d* – Solontsy-5; *e* – Ust-Isha.

for the disruption of this geographic regularity may be specific economic, climatic, and geographic conditions for the habitation of the human group that left the site.

A noticeable excess in the share of nitrogen isotopes in the collagen of two males from grave 15 at Firsovo XI relative to the main group (Fig. 3) probably indicates the dominance of fish in the diet and/or the origins of these individuals in other regions. Specific features of the isotopic profile of these individuals, who are also distinguished according to craniological data, might have affected the establishment of the radiocarbon age of grave 15. However, it should be mentioned that the impact of the "freshwater reservoir effect" associated, among other things, with the predominance of fish in the diet (Motuzaite Matuzeviciute et al., 2016), on anthropological evidence from the southwestern Siberia in the Chalcolithic and Bronze Age, with the exception of individual cases, has not yet been proven (Marchenko et al., 2015; Svyatko et al., 2017).

Conclusions

1. The results obtained make it possible to establish the radiocarbon age of the burials of the Bolshoy Mys culture (Novoaltaisk-Razvilka, burial 2 and Tuzovskiye Bugry-1, grave 7) as the turn of the 4th–3rd millennium BC, which is consistent with the previously proposed chronological framework of this culture (Kiryushin Y.F., Kiryushin K.Y., 2019: 106).

2. The question of isolating a group of burials (Firsovo XIV, grave 267 and Solontsy-5, graves 2, 3) in the Neolithic and Chalcolithic cemeteries of the Altai, which differ from the general number of burials by the specific features of their funeral rite (in a flexed position on the side) and radiocarbon age (Middle Neolithic, late 5th to early 4th millennium BC) should be possibly posed.

3. The burials that constitute the "cultural core" of the Firsovo XI cemetery (graves 14, 15, and 42) belong to the Early Neolithic, and their calendar age falls within a very narrow interval of several decades or centuries (1σ – 5710–5460 BC; 2σ – 5740–5360 BC).

4. As a working hypothesis, it may be suggested that the date obtained for burial 18 at Firsovo XI was not accidental (9106 ± 80 BP, GV-02889), and this burial actually belonged to the Final Mesolithic or Early Neolithic. The chronological and ritual distinctiveness of this burial is also emphasized by very large total dimensions of the skull of the buried man, which distinguishes him from the rest of those buried at the cemetery.

5. A diet with a predominance of fish consumption might have had an impact on the results of the collagen dating of the bones of individuals from early burials of Firsovo XI.

Acknowledgments

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