THE OCCUPATION HISTORY OF THE REGION BETWEEN THE DVINA AND LOVAT RIVERS IN RELATION TO THE DYNAMICS OF ENVIRONMENTAL CHANGE

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ABSTRACT. We show how ^{14}C dating may be combined with palynological and paleogeographical research to correlate human occupation history with environmental change, focusing on archaeological sites in the Dvina–Lovat River region of Russia. Cultures in this region range from Early Neolithic to the Middle Ages, *ca.* 5500 BC–AD 100, based on calibrated ^{14}C ages. The dynamics of water basins in the region, related to climatic change, are one cause of population migration.

INTRODUCTION

Many archaeological sites are a rich resource for paleoecological research, as the history of material culture is closely connected with environmental change. One of the tasks of archaeology is to clarify the relation between man and nature at different stages of human development, relying on a complex analysis and synchronization of archaeological, paleogeographical and palynological data. Such an approach was used by A. M. Mikliaev, who, for more than 30 years, led State Hermitage research teams, studying the evolution of different archaeological cultures from the Early Neolithic to the Middle Ages in the Dvina and Lovat Rivers region. This region is of great interest because its archaeological sites are concentrated within the limits of glacial-lake plains, with topography directly dependent on the dynamics of Holocene lake basins (Dolukhanov and Mikliaev 1989; Dolukhanov, Zaitseva and Mikliaev 1991). For millennia, the hydrology of the region has made the rivers and lakes not only the principal source of water and food, but also vehicles of human communication (Mikliaev 1992). Depending on varying precipitation, the rivers and lakes sometimes overflow or become shallow, thus compelling people to migrate following the water. Such migrations provide clues to comparative chronology, the absolute chronology is based on a large number of ^{14}C dates determined mainly at the Radiocarbon Laboratory of the Institute of the History of Material Culture of the Russian Academy of Sciences. The time scales obtained for specific sites were synchronized with the periods of transgression and regression over the whole region, providing us with a general scheme of the chronological evolution of prehistoric cultures against the background of changing environment.

METHODS

^{14}C dates from sites in the Dvina-Lovat region were obtained on wood samples, charcoal, peat and gyttja. Samples were pretreated using standard acid and alkali solutions with a concentration of ≤0.5%. Wood samples buried in peat show a chemical composition close to that of contemporary wood (Zaitseva 1992). Early Iron Age dates were obtained on charcoal samples from iron workshops found at the Mosti and Mezhuevo sites (Mikliaev, Mazurkevich and Korotkevich 1989). ^{14}C activity was measured using two-channel liquid scintillation counters with quartz vials of 3.2- and 6.8-ml capacities. To define the periods of transgression and regression more accurately, we also dated peat,

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gyttja and wood from stratigraphic horizons. The bottom deposits of basins were lithologically analyzed on the control cross-sections and correlated with the cultural layers of sites. Climate periods were determined according to palynological, diatomic and paleogeographical analysis (Dolukhanov and Mikliaev 1986; Dolukhanov, Zaitseva and Mikliaev 1991; Mikliaev 1992). We converted ^{14}C dates to calibrated calendar date ranges using the computer program CAL15 (van der Plicht 1993).

Discussion

All the archaeological sites we studied were located near the borders of the Pskov and Smolensk oblasts of Russia and the Vitebsk oblast of Byelorussia, in the forest zone of the former USSR (Fig. 1). Table 1 presents ^{14}C dates with calibrated date ranges at 1 σ and 2 σ confidence levels. Figure 2 shows the chronological sequence of archaeological cultures against the background of environmental changes. The paleogeographical scale was reconstructed by A. Mikliaev, based on data from different archaeological sites (Mikliaev and Minasyan 1971; Mikliaev 1972; Mikliaev and Semenov 1979; Dolukhanov and Mikliaev 1986). Calibrated ^{14}C dates obtained for different archaeological cultures were summarized and combined with the paleogeographical data in a common scheme. The schema presented suggests that settlement of the region depended on the fluctuation of water levels

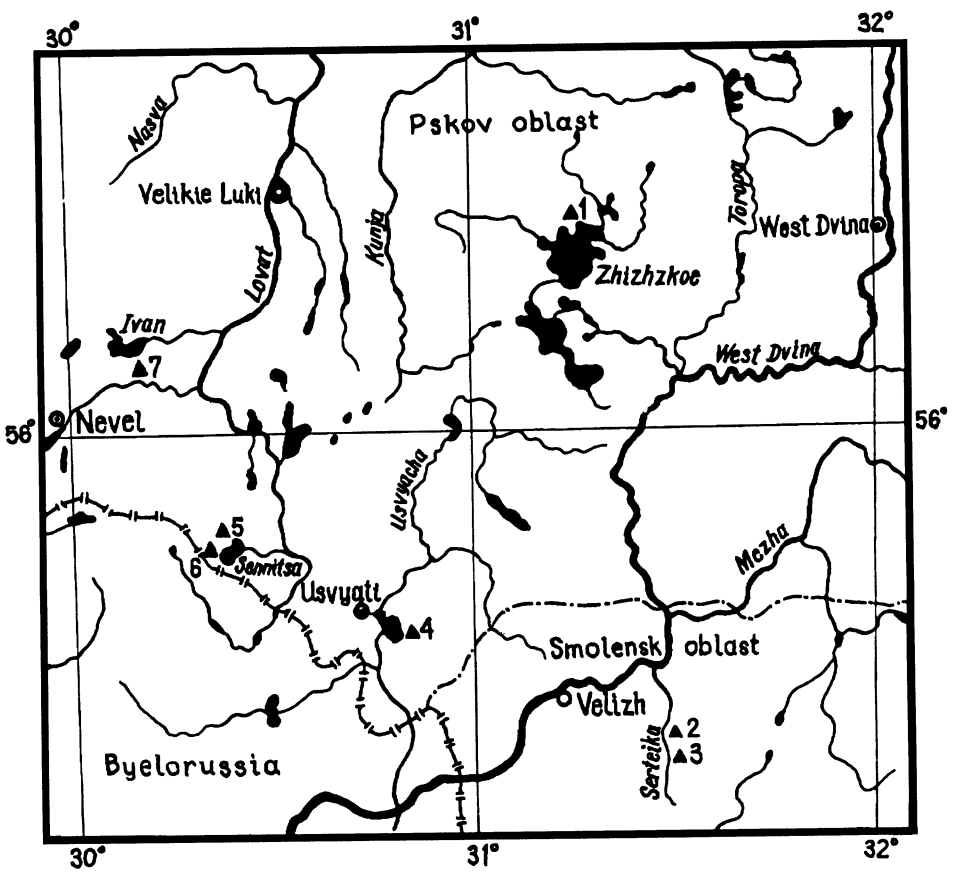

Fig 1. The location of archaeological sites in the region of the Dvina and Lovat River basins. 1. Naumovo; 2. Rudnya Serteiskaya; 3. Serteya; 4. Usvyati; 5. Dubokray; 6. Mosti; 7. Mezhuevo.

in the rivers and lakes over a 7-ka period. The region was occupied during the Upper Paleolithic and was deserted at the beginning of the Würmian (Mikliaev 1992). This territory has been continuously inhabited since the Late Pleistocene, when the water level reached maximum (transgression 1). However, no ^{14}C dates are available for the initial settlement period. Typological features of pottery have traditionally been the main criteria in identifying archaeological cultures (Mikliaev 1992; Mikliaev, Mazurkevich and Korotkevich 1989).

TABLE 1. The Chronology of Archaeological Sites of the Dvina-Lovat River Region

Lab no.	Material	^{14}C age (yr BP)	Calibrated age BC/AD*	
			1 σ	2 σ
Rudnya Serteiskaya				
Le-3054	Wood	6240 ± 40	5246–5048 BC	5282–5002 BC
Le-2568	Wood	6230 ± 40	5230–5080 BC	5256–5070 BC
Le-2569	Wood	6180 ± 70	5220–5008 BC	5354–4946 BC
Le-2579	Wood	6130 ± 40	5196–4960 BC	5208–4940 BC
Le-2566	Wood	5940 ± 60	4908–4774 BC	4946–4698 BC
Le-4101	Wood	5940 ± 75	4912–4726 BC	5040–4612 BC
Le-2568	Gyttja	5890 ± 60	4894–4712 BC	4912–4602 BC
Le-4100	Wood	5850 ± 70	4800–4606 BC	4902–4538 BC
Le-2577	Wood	5780 ± 50	4710–4572 BC	4770–4522 BC
Le-2570	Wood	5770 ± 60	4702–4546 BC	4770–4472 BC
Le-4104	Wood	5560 ± 75	4462–4342 BC	4540–4248 BC
Le-4107	Wood	5540 ± 145	4540–4170 BC	4710–4040 BC
Le-2580	Wood	5570 ± 60	4456–4356 BC	4526–4270 BC
Le-2578	Wood	5530 ± 40	4450–4342 BC	4458–4270 BC
Le-4102	Wood	5490 ± 65	4450–4252 BC	4460–4166 BC
Le-3000	Wood	5480 ± 60	4444–4248 BC	4456–4168 BC
Le-3020	Wood	5390 ± 40	4326–4164 BC	4338–4092 BC
Le-3001	Wood	5390 ± 60	4330–4154 BC	4346–4044 BC
Le-4111	Wood	5440 ± 139	4450–4090 BC	4530–3980 BC
Le-4103	Wood	5320 ± 75	4234–4040 BC	4530–3980 BC
Le-4105	Wood	5370 ± 75	4328–4086 BC	4346–4000 BC
Le-3674	Wood	5180 ± 80	4214–3814 BC	4224–3794 BC
Le-2567	Wood	4870 ± 40	3694–3640 BC	3762–3536 BC
Le-2585	Gyttja	4440 ± 50	3296–3640 BC	3762–3536 BC
Le-2587	Gyttja	4320 ± 40	3018–2884 BC	3034–2878 BC
Le-2571	Wood	4020 ± 60	2610–2562 BC	2862–2948 BC
Le-3002	Wood	3980 ± 70	2478–2350 BC	2858–2206 BC
Le-2562	Peat	3790 ± 40	2280–2140 BC	2992–2044 BC
Serteya II, VII, XI				
Le-4113	Wood	5120 ± 80	3986–3800 BC	4214–3710 BC
TA-242	Wood	4830 ± 30	3650–3542 BC	3692–3532 BC
Le-4112	Wood	4760 ± 100	3640–3380 BC	3780–3140 BC
Le-4108	Wood	4590 ± 75	3500–3106 BC	3618–3040 BC
Le-4110	Wood	4620 ± 100	3610–3110 BC	3630–3040 BC
Le-4109	Wood	4000 ± 140	2860–2290 BC	2890–2140 BC
Le-3676	Wood	3980 ± 70	2578–2350 BC	2358–2206 BC
Le-2572	Wood	3790 ± 40	2280–2140 BC	2392–2044 BC

TABLE 1. (Continued)

Lab no.	Material	^{14}C age (yr BP)	Calibrated age BC/AD* 1 σ	2 σ
Dubokrai				
Le-3003	Charcoal	4720 ± 40	3620–3378 BC	3630–3372 BC
Le-3891	Wood	4430 ± 60	3290–2924 BC	3334–2916 BC
TA-202	Wood	4210 ± 70	2890–2628 BC	2918–2586 BC
TA-817	Wood	4150 ± 80	2872–2616 BC	2896–2494 BC
TA-633	Wood	4120 ± 60	2866–2580 BC	2876–2494 BC
TA-202	Wood	4100 ± 70	2864–2502 BC	2874–2474 BC
Le-2994	Charcoal	4080 ± 40	2854–2500 BC	2854–2486 BC
Le-2840	Wood	3720 ± 40	2184–2036 BC	2268–1976 BC
Le-2839	Wood	3240 ± 40	1522–1442 BC	1608–1416 BC
Le-3838	Wood	3660 ± 40	2124–1968 BC	2136–1914 BC
Naumovo				
Le-1006	Wood	4920 ± 50	3764–3650 BC	3896–3634 BC
Le-1007	Wood	4030 ± 50	2586–2468 BC	2860–2408 BC
Le-816	Wood	3700 ± 70	2190–1974 BC	2282–1890 BC
TA-634	Wood	3650 ± 70	2132–1914 BC	2198–1780 BC
TA-756	Wood	3620 ± 70	2120–1882 BC	2184–1760 BC
Le-1004	Wood	3690 ± 70	2186–1966 BC	2282–1884 BC
Usvyati				
Le-651	Wood	5530 ± 90	4462–4258 BC	4550–4098 BC
TA-105	Wood	4570 ± 70	3488–3106 BC	3508–3056 BC
TA-244	Wood	4510 ± 70	3340–3098 BC	3370–2926 BC
TA-243	Wood	4310 ± 80	3078–2706 BC	3298–2622 BC
TA-203	Wood	4110 ± 70	2866–2508 BC	2876–2490 BC
Le-649	Wood	3920 ± 90	2558–2208 BC	2846–2052 BC
Le-2840	Wood	3870 ± 40	2452–2282 BC	2458–2202 BC
Le-2833	Wood	3830 ± 40	2330–2152 BC	2452–2140 BC
Le-2675	Wood	3790 ± 40	2280–2140 BC	2392–2044 BC
TA-466	Wood	3905 ± 70	2468–2212 BC	2568–2144 BC
TA-469	Wood	3860 ± 60	2452–2204 BC	2466–2140 BC
TA-467	Wood	3800 ± 80	2394–2048 BC	2460–1984 BC
Mezhuevo				
Le-3677	Charcoal	2340 ± 80	748–208 BC	762–194 BC
Le-3678	Charcoal	2200 ± 100	380–120 BC	410–60 BC
Le-3679	Charcoal	2080 ± 100	200–60 BC	370–120 BC
Mosti				
Le-4211	Charcoal	1390 ± 80	AD 596–718	AD 466–874
Le-4633	Charcoal	1460 ± 130	AD 430–690	AD 270–880
Le-4634	Charcoal	1490 ± 90	AD 450–654	AD 392–760

*In the case of multiple calibrated ranges, only the extreme high and low dates are given here.

The main site, dating from the Early Neolithic, is Rudnya Serteiskaya, with two Early Neolithic cultures (Dolukhanov and Mikliaev 1989). At present, no material for ^{14}C dating is available for the oldest Serteiskaya culture. The subsequent Rudnenskaya culture, genetically connected with Serteiskaya, developed in several stages during *ca.* 1 ka synchronous with regression 2 and transgression 3. At the beginning of transgression 3, the population moved to higher elevations. The appearance of the Dubokrai site can be dated from the same period. At present, this site is underwater and is

being studied by underwater archaeologists (Mikliaev 1990). Rudnenskaya pottery of the middle phase exhibits some features characteristic of the Narva culture from the Baltic late phase which has parallels with the Upper Volga cultures, indicating that the region was a link between the Baltic and Upper Volga regions.

Transgression 4, following regression 3, corresponds to the transition from Early to Middle Neolithic. The main site of this period is the peat site Usvyati, containing several occupation stages.

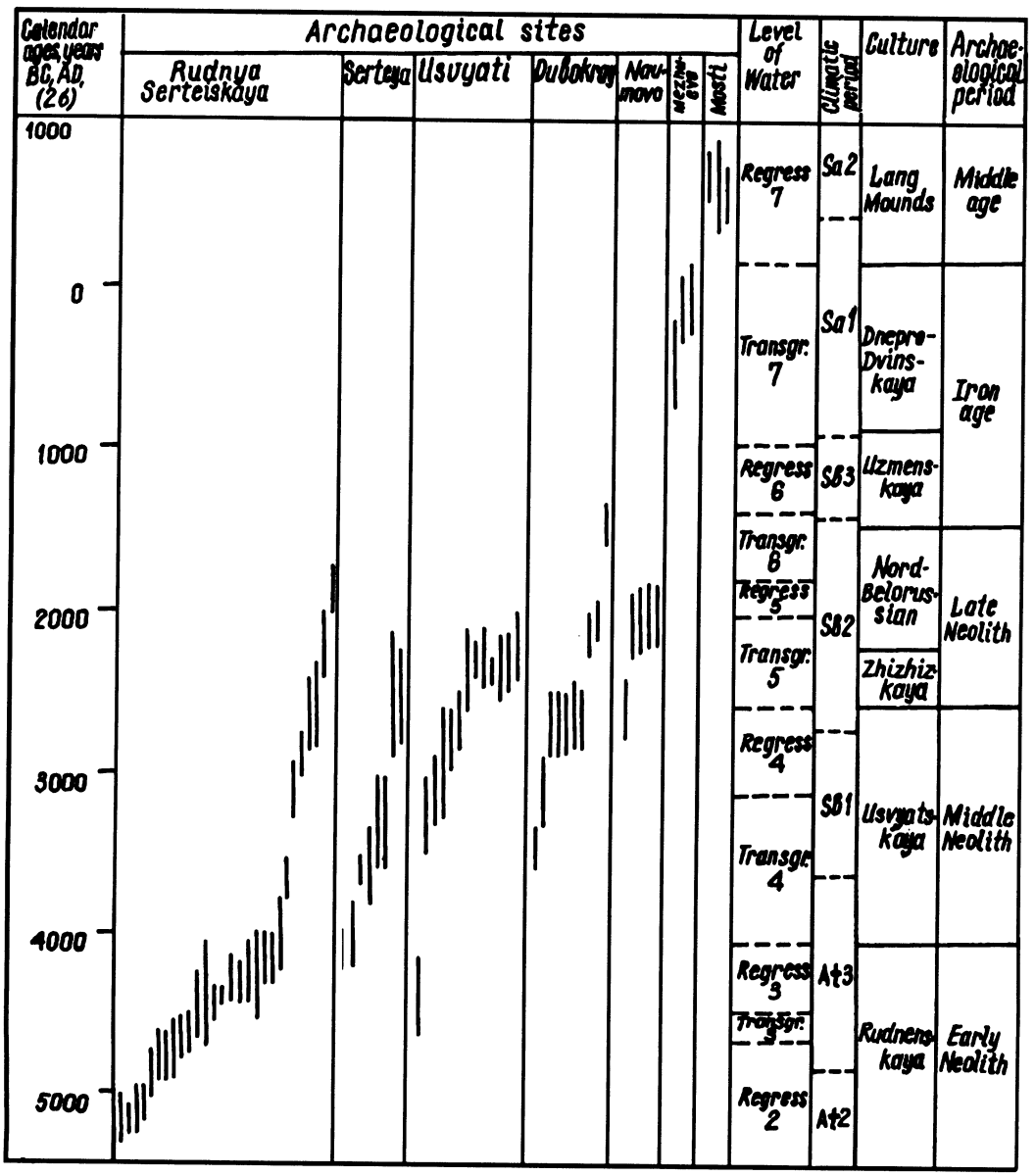

Fig. 2. Chronological correlation of archaeological cultures and paleogeographical evidence in the West Dvina–Lovat River region. Climate classifications: Sa = Subatlantic; Sb = Subboreal; At = Atlantic.

Material from this site, as well as from the Serteya site, provides evidence for a 500-yr development of the Usvyati Neolithic culture which, based on pottery, went through three phases of development. Its initial period, according to samples from pile-dwellings, dates from the late 5th millennium BC. As transgression 4 continued, it led to the building of dwellings on high ground, characteristic of the Dubokray and Naumovo site, where the Usvyati culture came into its next phase (Mikliaev and Dolukhanov 1984).

Regression 4 lasted for a short time and was followed by transgression 5, when pile settlements were built at the Naumovo site. These structures and materials are connected with the Late Neolithic Zhizhizkaya culture that followed the Usvyatskaya culture dating from the 3rd millennium BC (Mikliaev and Semenov 1979). The subsequent North-Byelorussian culture was excavated in the upper layers of the Naumovo, Serteya and Dubokray sites (Mikliaev 1972). It developed during regression 5, following by transgression 6, which washed away all the pile structures. The big log stuck in the remains of pile constructions (Dubokray settlement) is thought to have washed away during the flood. ^{14}C dates on these wood samples suggest that a disastrous flood took place *ca.* 1500 BC.

The schema presented here has a gap of *ca.* 700 yr in ^{14}C dates. Unfortunately, material for ^{14}C dating was not retrievable from corresponding stratigraphic layers, which contained practically no organic materials. The border between regression 6 and transgression 7 and their durations were determined only by paleogeographical and palynological analysis. The lack of material for ^{14}C dating hinders us from precisely tracing the developmental stages of the Uzmen culture. The sequence of archaeological cultures was researched by stratigraphic and typological methods, and the conclusions are valid (Mikliaev 1992). But it is necessary to note that the archaeological cultures of the Early Iron Age for the Forest zone of Russia, *i.e.*, the Uzmen culture, have been studied less than those of the Neolithic. One can assume that the lower boundary of the Uzmen culture corresponds to the upper layers of North-Byelorussian culture, and the upper boundary connects with the beginning of the Dnieper-Dvina culture. Thus, the duration of the Uzmen culture is *ca.* 1500–1000 BC. Insufficient material is available to trace the evolution of the Uzmen culture into the subsequent Dnieper-Dvina culture, from which artifacts have been found at the Mezhuevo site (Korotkevich and Mazurkevich 1992). Remains of an iron-extracting workshop have been uncovered here. Falling temperatures and an increasingly humid climate worsened living conditions in the lake valleys, stimulating migration to neighboring hills. The tops of hills ceased to be used for settlements, but were sometimes used for workshops to extract and process iron.

Beginning *ca.* the first millennium AD, regression 7 developed at a time of rising temperatures; decreasing levels in rivers, lakes and subsoil water made it possible to expand pasture area and to use fertile plots for farming, the development of which can be established by a number of indirect features. Favorable climatic conditions and the development of ferrous metallurgy, farming and stock-breeding promoted the appearance of communities on an advanced social level, manifested in the separation of trade from farming. All of this gave impetus to the transformation of Dnieper-Dvina culture into the Long Mounds culture that developed during regression 7. In Lake Sennitsa, frame foundations of an iron-extracting workshop with the remains of slag have been uncovered. Based on dates from charcoal samples incorporated into the slag, the Long Mounds culture appears to have existed in the region beginning in the 6th century AD, before its eventual transformation into one of the components of ancient Russian culture (Mikliaev, Mazurkevich and Korotkevich 1992).

Conclusion

Research into a wide range of archaeological sites in the region of the Dvina and Lovat Rivers allowed us to retrace schematically the history of cultural development beginning with the Early

Neolithic. Although changes in the water level of lakes and rivers were not the only reason for the evolution of material culture, they certainly influenced local migration. Generalization of archaeological, paleogeographical, palynological and ^{14}C data available enabled us to correlate the environmental changes and the transformation of different archaeological cultures. The research presented here was limited to the Dvina and Lovat basins, but one can hope that it will be possible in the future to connect the same data to that from the neighboring regions of the Baltic and the Upper Volga, and to synchronize the occupation history over a wider territory.

Acknowledgment

Our colleague Dr. A. M. Mikliaev is no longer among us; the importance of his contribution to this investigation is difficult to describe. This article is dedicated to his memory.

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