INVESTIGATIONS OF THE EVOLUTION OF THE BALTIC SEA AND EARLY HUMAN SETTLEMENT IN THE EASTERN BALTIC AREA (BASED ON MATERIALS FROM THE KALININGRAD REGION)

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Abstract

This article treats a wide-ranging scientific project 'The Evolution of the Baltic Sea and the Stages of the Earliest Human Settlement in the Southeast Baltic' that started in 2009. The main research methods consist of multidisciplinary investigations of key archaeological sites and former glacial water-pools and bogs. The final result of the project is expected to be a model of demographic processes that occurred in the southeast Baltic during the Late Glacial and Early Holocene set against environmental changes.

Key words: evolution of the Baltic Sea, palaeogeographic reconstructions, Palaeolithic, earliest settlements, southeast Baltic.

Introduction

The question of the earliest settlement of a territory is one of the most important and principal ones in Stone Age archaeology. It is a kind of benchmark in relations between nature and humans. Stone Age archaeological sites, especially Palaeolithic and Mesolithic ones, are vary rare. They are of great value because of the unique information they give us about the earliest stages of the development of human society. For various historical reasons, there is less information about social and economic processes in the Palaeolithic and Mesolithic in the Kaliningrad region of Russia than about neighbouring areas of northern Poland and southwest Lithuania. The present state of our knowledge on the Palaeolithic in the Kaliningrad region is based on previously single finds that are not linked with any complex. Basically, it is casual finds of the tips of arrows, harpoons, and other products made from bone and horn which have been found during land reclamation work (Gross 1938, p.83ff). Most of them exclude not only the possibility of determining their cultural identity, but also their indisputable recognition as belonging to the Late Glacial. Research into the Late Palaeolithic of the area under discussion goes back to the middle of the 19th century. The initial stage of studying questions concerning the development of the environment of East Prussia, the cultural identity of the first settlers of the region, and the time and routes of the settling was covered by the German archaeologists C. Engel (1935), W. Gaerte (1929), H. Gross (1938) and Engel W. La Baume (1937), and the work of some specialised research establishments, the Prussian Society of Antiquities (Altertumsgesellschaft Prussia), formed in Königsberg in 1844, and a naturalists' society, Physikalisch-Ökonomische Gesellschaft, formed in 1870. The time from the beginning of the 19th century to 1945 was marked by a steady interest in studying the development of the environment and human society in East Prussia, the beginning of purposeful archaeological research, and the accumulation of information. The study of issues of primitive archaeology in the Kaliningrad area after the Second World War and in the modern period of research is characterised by a lack of uniformity. Without exhaustive data on Late Palaeolithic sites, it is impossible to form a complete and consistent picture of the earliest settlement of the area. Considering this, in the investigation of the Palaeolithic-Mesolithic settlement of the Kaliningrad region, the methods and data of the palaeogeography, and computer reconstructions of the ancient environment that are based on them, should be treated in the same light as the archaeological research.

The project 'The Evolution of the Baltic Sea and the Stages of the Earliest Human Settlement in the Southeast Baltic' was initiated by Immanuel Kant State University in Kaliningrad. The project looks at fundamental problems related to the Late Glacial and Post-Glacial evolution of the Baltic Sea, and its impact on prehistoric migrations of populations in the southeast Baltic.

Advanced methods of radiocarbon dating, combined with palaeoenvironmental and palaeolimnological studies, make it possible to correlate the early stages of human settlement with the evolution of the Baltic Sea and internal waterways in the southeast Baltic.

The project's objectives include:

1. An assessment of the impact of environmental change on prehistoric settlements in the southeast Baltic.

2. The role of waterways in the contacts of local groups.

3. The impact of ecological factors on the emergence of economic entities.

4. New data on Stone Age archaeology and palaeogeography, and climate and landscape changes on the border of the Late Glacial and Holocene.

Methods

Within the framework of our research, there are two main parts to our investigations. In the first preliminary stage, numerous data on palaeogeography were summarised, and several conclusions about features of the Late Glacial environment were made. To optimise the archaeological research, especially prospective, some methods of palaeogeography were applied in the preliminary stage of the studies. They included different kinds of palaeogeographic reconstructions, and working out maps based on them. These last reflect the geomorphological, climatic and landscape situations for each period of the Late Pleistocene and Early Holocene. The correlation of these maps and a retrospective analysis permits us to define territories with the most convenient natural characteristics, and therefore which were settled by ancient people first. The factors that contributed to colonisation were parameters of the meso-relief, water resources, the location of sources of raw materials, and the character of the substrate. The following tendencies for the distribution of Palaeolithic and Mesolithic sites in Kaliningrad region were noticed: a geographical linkage to river valleys, continental dunes, and sandy and gravel substrates a small distance from sources of raw materials. This approach allows us to make a prognosis, and to divide areas which offer the most hope for field prospecting.

The second part of our project includes field research, which consists of archaeological prospecting, the investigation of key archaeological sites, and the investigation of objects of the palaeohydrological net.

The archaeological sites and wetlands are investigated with the use of:

1. A GIS-aided survey
2. Radiometric dating
3. Pollen analysis
4. Diatom analysis
5. Geochemical analysis
6. The development of an electronic archaeological and palaeolandscape database
7. The development of GIS-aided maps.

The main methods of palaeogeographical investigation are coring and sampling of bog, lake and mire deposits, with the subsequent high-resolution radiocarbon dating, pollen and diatom analyses. The sampling is carried out with the use of a strengthened one-metre-long Hiller's corer, a Russian corer (inner diameter 5 and 7.5cm). The coring of lake bottom deposits is carried out both from ice (in winter and early spring) and from rafts (in summer). Samples for pollen and diatom analysis are taken from the cores at five-centimetre intervals, and prepared using standard techniques. The identification is carried out at the Institute of Limnology RAS and the Institute of Geography at St Petersburg State University. The radiocarbon dating of organic samples is carried out at the laboratories of the Institute of Geography, St Petersburg State University, and the Institute of History of Material Culture RAS, with the use of the liquid scintillation (LS) counting method.

Within the framework of the project, the duration of the field research is three years. In 2009, the internal eastern areas of the Kaliningrad region (the valley of the River Sheshupe/Šešupė) were investigated. In 2010 and 2011, studies in the central part of the region and the western coastal areas will be held. Special attention will be paid to changes in the Baltic Sea regime on the border of the Late Glacial and the Holocene, and the investigation of the ancient coastal terraces.

Intermediate results of the archaeological and palaeogeographic research

The palaeogeographic situation of the Palaeolithic is reconstructed proceeding from an analysis of quaternary stratigraphy (Druzhinina 2005, pp.34-78). On the existing topographic base, data reflecting the levels of the glacier lakes' expansion was put down, and then a number of maps were worked out using graphic software (Figs. 1, 2). Figures 1 and 2 show the correlation of land, bodies of water and the ice sheet of the area under discussion in the Lower Dryas period. Approximately 15,000 to 14,000 years BP, after the recession of the ice sheet, numerous barrier lakes appeared in the ancient valleys of the rivers Neman/Nemunas, Šešupė/Sheshupe and Pregolya. The area to the east and south was tundra zone, where reindeer migrated for summer grazing, and they could be followed by the first human groups of hunters. We can conclude that the earliest Stone Age sites could be found just in these parts of the region. The palaeogeographic data justify the sur-

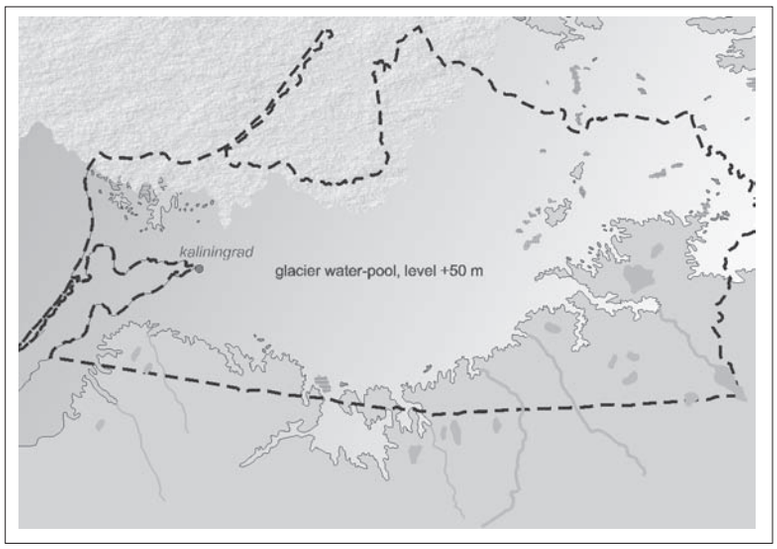

Fig. 1. The palaeogeographic situation of the Kaliningrad region in Dryas I.

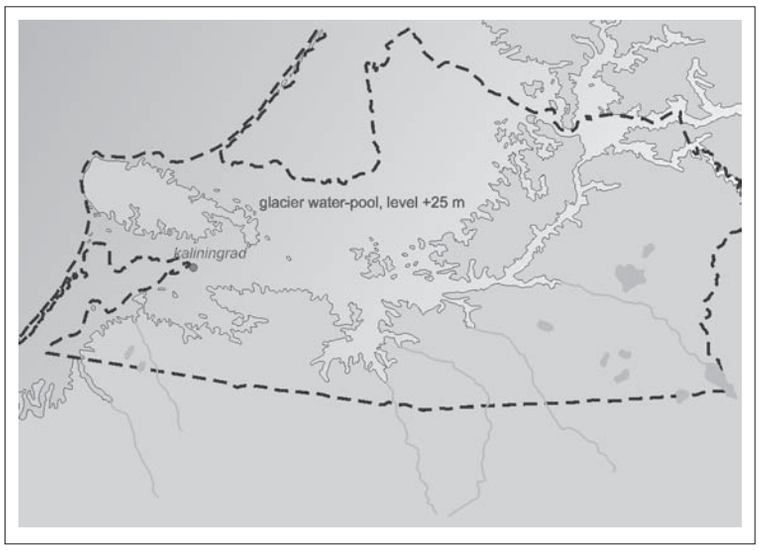

Fig. 2. The palaeogeographic situation of the Kaliningrad region at the end of Dryas I.

mise that from the end of the Lower Dryas period the environmental conditions were rather favourable, or at least did not hamper human settlement there. Under arctic climatic conditions characterised by the lack of a humus layer, only limited arctic biocenoses could survive. Specific landscapes, typified by a combination of tundra-steppe features, periglacial steppes, were widespread. Humans could penetrate the area from the south after the recession of the glacier by moving along the sides of the glacier water pools. During the Böling period, the first significant warming of the Late Glacial took place. This led to the spread of park-tundra landscapes. Since this time, being free of ice, the whole region became suitable for settlement. It is our assumption that the valley of the River Sheshupe was the kind of area where traces of the earliest settlement, dating from the Late Palaeolithic, can be found. After the recession of the ice sheet, a barrier lake appeared here. In the process of a decrease in the basis of erosion on the site of an extensive glacial reservoir in the River Sheshupe valley, the numerous isolated lakes, of which the existence could last hundreds of years, were formed, and parts of the rivers gradually united in a uniform system. The district bordering residual reservoirs represented the alternation of flat and hilly sites of the relief, combined by sand, sandy loams, peat and sand-gravel mixes. Thus, in a relief of plain files and ridges, morainic hills with average heights of 30 to 40 metres, and also a flat closed downturn, emerged. One feature of the relief forming at the end of the Pleistocene was the high activity of eolian processes. As a result, the surface of the Sheshupskaya plain is complicated by well-developed eolian forms, single dunes, systems of complex branched-out dunes, and small ridges. It is possible to assume that a varied relief, including continental dunes, ancient streams

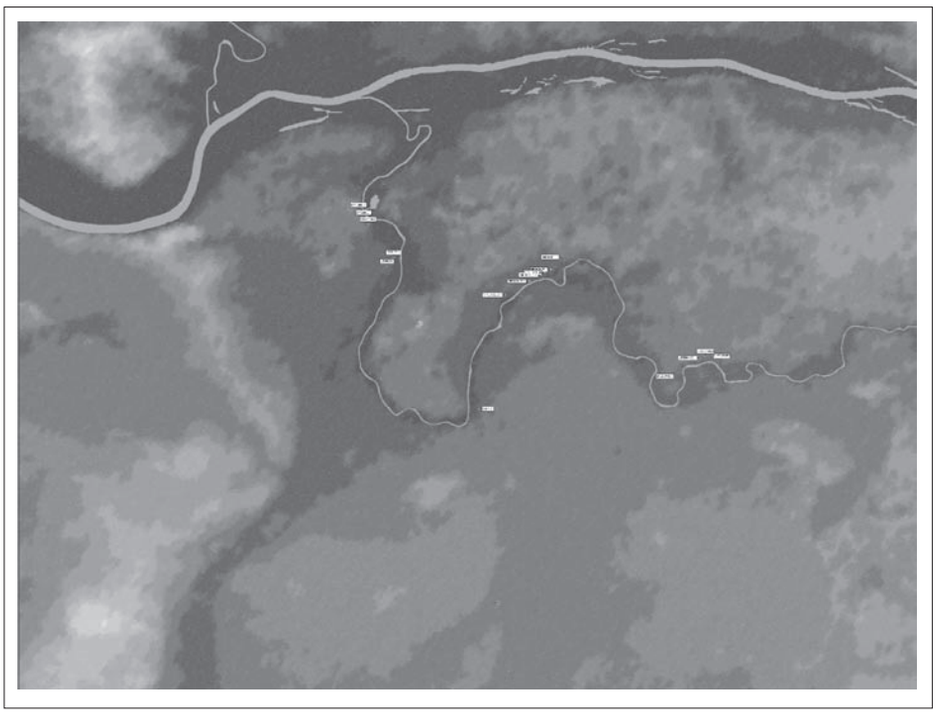

Fig. 3. The studied area: the valley of the River Sheshupe and Palaeolithic-Mesolithic sites.

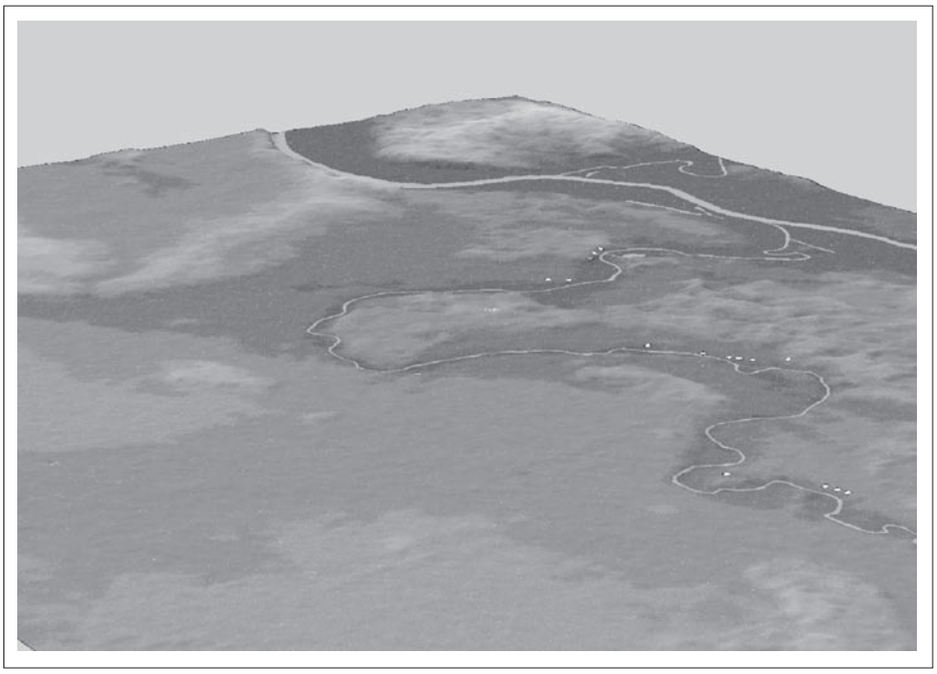

Fig. 4. A 3-D model of the relief and the Palaeolithic-Mesolithic sites. The valley of the River Sheshupe.

valleys, river capes, the prevalence of a sandy substratum, and the availability of flint raw material presented in the structure of sandy-gravel outputs, could become attractive features of valley landscapes still in the Late Glacial. The climatic conditions at the end of the Pleistocene varied repeatedly; however, even the significant cold snap in the Dryas period was possibly not an obstacle for visiting the region. The landscape conditions within the limits of the River Sheshupe valley also underwent numerous changes. The general picture of change in the environment looks as follows: landscapes of open tundra in the Early Dryas take the shape of park tundra with a light pine-birch forest and a high role of grasses in the Böling; in the Middle Dryas, grassy communities gave way to pine-birch woods in the Alleröd; at last, finishing the Late Glacial, the cold snap in the Late Dryas led to the regeneration of landscapes of tundra and forest-tundra, with the domination of grasses and dwarf forms of birch and willow, and also juniper. The investigations in the lower course of the river started in 2006 (Druzhinina 2007, pp.3-30). During the prospecting between 2006 and 2009, the

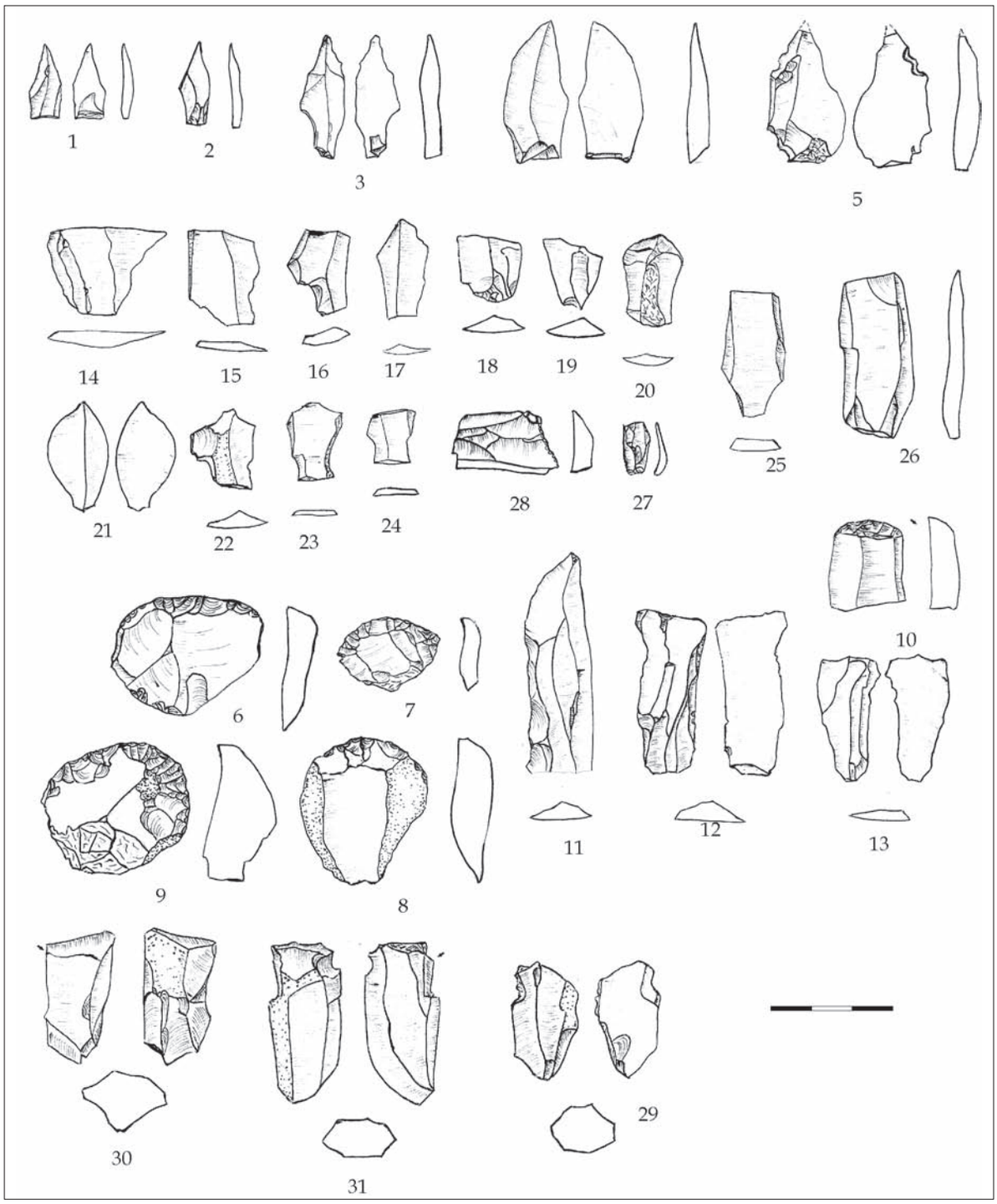

Fig. 5. The Ryadino 5 site: flint finds from 2008.

surface of the partly preserved second and third 'high' terraces was surveyed (Figs. 3; 4). On the left bank of the river, several sites were uncovered. They are 100 to 200 metres from each other, and are situated eight to 12 metres above the river on the edge of the second terrace. Its modern surface is sandy, covered with a pine forest. The collection of flint tools includes the fragments of cores, end scrapers on blades, burins, knife blades and bladelets. They are made of local dark grey flint. Most of the finds are covered with a porcelainised patina. The topographical features of the localisation of monuments on a high second terrace, a strong patina and an archaic kind of subjects, allow us to date them preliminarily to the Late Palaeolithic period.

In November 2009, excavations of one of these sites, Ryadino 5, took place. The arrangement of the Ryadino 5 site is characterised by the greatest height (12m) above the water level in comparison with other objects in the group. In the relief, the site occupies a flat plat-

form on the edge of a terrace. The preliminary dimensions of the site defined on an elevated level are 200 metres (NW–SE) by 80 metres (SW–NE). The quantity of flint finds is about 900. The flint finds are presented as products without secondary processing, and cores and instruments of labour (Fig. 5). Two forms of cores have been found: cone-shaped one-platform and prismatic. Worked cores were possibly used as burins. Among the products without secondary processing, the majority are flakes; the quantity of blades is much less. Tools in the Ryadino 5 collection are of various kinds. The majority of the scrapers found are circular-end ones, made from flakes; several are with the remains of nodule crusts. Their working edges are finished by large and small blunting retouch, which is put only on the back of products, and thus covers from half to two thirds of the perimeter of the scrapers. End-scrapers on the blades have been found, too. Bladelets, fragments of knife blades, have been found. For the technique of manufacturing products, the presence of truncated semi-finished products and splitting by a rigid pressure flaking tool is characteristic. It is intended to make a trasological analysis of the finds. In the cultural layer, traces of economic constructions, including ash-filling and coal have been found; samples have been selected for radiocarbon analysis. Traces of buried soil, giving the chance to make a palynological analysis, have possibly been revealed. This archaeological site is the most ancient of the Stone Age settlements excavated so far in the Kaliningrad region (Druzhinina 2008, pp.5-20). However, there is not yet enough data to make conclusions about the cultural attribution of the Palaeolithic population which left this settlement.

Archaeological work in the River Sheshupe valley was supplemented by a set of palaeogeographic research aimed at reconstructing the evolution of the Late Glacial to Early Holocene environment. As an object of study, in 2009 the Great Peatbog (54º 57'06 "N, 22º 20'28" E, 34 m above sea-level) was chosen. The cut of the Great Peatbog is represented by layers characterising changes in the environment throughout the last 7,500 years. The earliest dating, 7520±70 cal. years (LU-6261), was received from a depth of 6.6 to 6.5 metres from the present surface of the peatbog. Botanical and diatom analyses, together with radiocarbon dating, allow us to track the history of the development of the reservoir, of which the occurrence concerns the beginning of the Atlantic period. As a whole, the data obtained keeps within the existing scheme of the development of a hydronetwork in the southeast Baltic in the Holocene, thus essentially enlarging on it. The expected results of the palynological study of tests will add a picture of changes in the landscape conditions in the River Sheshupe valley.

An important component of the research done is the application of GIS-technology. All information on Stone Age monuments gathered during field research in 2009, and also in work with archives and literature, has been systematised in the form of drawing up an electronic database. During the relevant period, the working version specialised AGIS 'Stone Age Sites in the Kaliningrad Region', which contains information on 110 objects, was created. The electronic database includes the following characteristics: geographical position, modern topographical position, palaeogeographical characteristics, cultural attribution, chronology, and features of the material culture (data on tools and other finds). The structure of the system created provides storage, search and the analysis of information, without a dependence on foreign software, and the organisation of its direct interaction with a geoinformation system for subsequent analysis means GIS with the use of digital maps.

As the final result of the project, we expect to obtain a model of demographic processes that occurred in the area of the southeast Baltic during the Late Glacial and Early Holocene against environmental changes.

Acknowledgements

This exploratory project is financed by the Russian Foundation for Basic Research (project 09-06-00150a).

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Received: 14 June 2010; Revised 19 October 2010;
Accepted: 28 December 2010.

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