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RESULTS ON ABSOLUTE AND RELATIVE CHRONOLOGY BASED ON MATERIALS FROM THE MULTI-LAYERED SETTLEMENT SITE OF VEKSA 3

Н.Г. Недомолкина, Х. Пиецонка. ***Результаты исследований по абсолютной и относительной хронологии, основанных на материалах многослойного поселения Векса 3***

Относительная хронология определяет лишь последовательность событий, поэтому предпочтение получают данные абсолютной хронологии, для которой используются естественнонаучные методы. В связи с общим отсутствием надежных дат и контекстной информации в слоях каменного века абсолютная хронология все еще является предметом для обсуждения. В результате многолетних исследовательских работ в бассейне Верхней Сухоны выявлены опорные памятники, которые названы Векса. Исключительная важность Вексинского комплекса связана с четко стратифицированными до 3 м напластованиями с включениями культурных слоев раннего неолита — средневековья, что способствовало созданию относительной хронологии и выделению типологических комплексов в их развитии. Начавшиеся в 2007 г. совместные российско-германские исследования направлены на мультидисциплинарные исследования памятников. Методы, которые использовались в исследованиях на Вексе, включают датировки АМС, изотопные и археохимические анализы разных материалов (кости, нагар на керамике), археоботанику, палинологию, дендрохронологию, реконструкцию развития ландшафта и др. Полученные результаты способствуют созданию надежных хронологических рамок выявленных культурных комплексов и решению широкого круга вопросов.

Veksa — a pivotal site in the eastern European forest zone

The pre- and early historic settlement of Veksa in the upper Sukhona basin is a key site with regard to the cultural development of north-western Russia. It is extending c. 2 km along the left bank of River Vologda, with the part west of the mouth of the eponymous stream called Veksa 1 and the part east of the mouth called Veksa 3. The exceptional importance of Veksa is due to the clearly stratified sequence of archaeological layers amounting up to 3 m in depth and spanning eight millennia from the Early Neolithic to the Middle Ages,

and to the good preservation of organic remains including wooden artefacts in part of the prehistoric layers. Archaeological investigations at Veksa have been conducted since the 1980s and have been intensified in the 1990s when a regular archaeological expedition to the site was installed and directed by N. G. Nedomolkina of Vologda State Museum-Preserve (Недомолкина, 2000; Недомолкина, 2004). Starting in 2007, joint Russian-German investigations have concentrated on multi-disciplinary research at the site, including AMS radiocarbon dating, isotope and archaeochemical analyses of various materials (bone, charred pottery crusts, etc.), archaeobotany and palynology, dendrochronology, geomorphology and pedology (Недомолкина и др., 2015a). This work has been intensified in 2015 when a larger research project has been granted by the German Research Foundation (DFG), enabling the conduction of new test trenching at the site as well as targeted research towards a diachronic assessment of human-environment interactions and palaeolandscape reconstructions.

Radiocarbon dating and dendrochronology: New results from Veksa 3

An important aspect of the on-going research at Veksa concerns the relative and absolute chronology of the anthropogenic remains, but also of their temporal interrelatedness with developments of the natural environment. Previous research on the materials from Veksa 3 has resulted in a sequence of ca. twenty radiocarbon dates, both conventional and AMS, starting in the first half of the 6th millennium cal BC and indicating the chronological position of main ceramic complexes of the Early, Middle and Late Neolithic/Early Metal Ages (Nedomolkina, Piezonka, forthcoming; Piezonka, 2015; Piezonka et al., 2016).

To further elaborate the absolute chronology at Veksa and to better understand human-environment interactions in this region from the Early Neolithic onwards, systematic AMS dating in connection with sedimentological, archaeobotanical and archaeozoological analyses was conducted on materials from test trench 1 excavated in 2015/2016 in the area of the river terrace where the prehistoric stratigraphy is best represented, according to previous excavations. This way, the genesis of the anthropogenic layers in connection with the dynamics of the river landscape as well as temporal aspects of typological developments

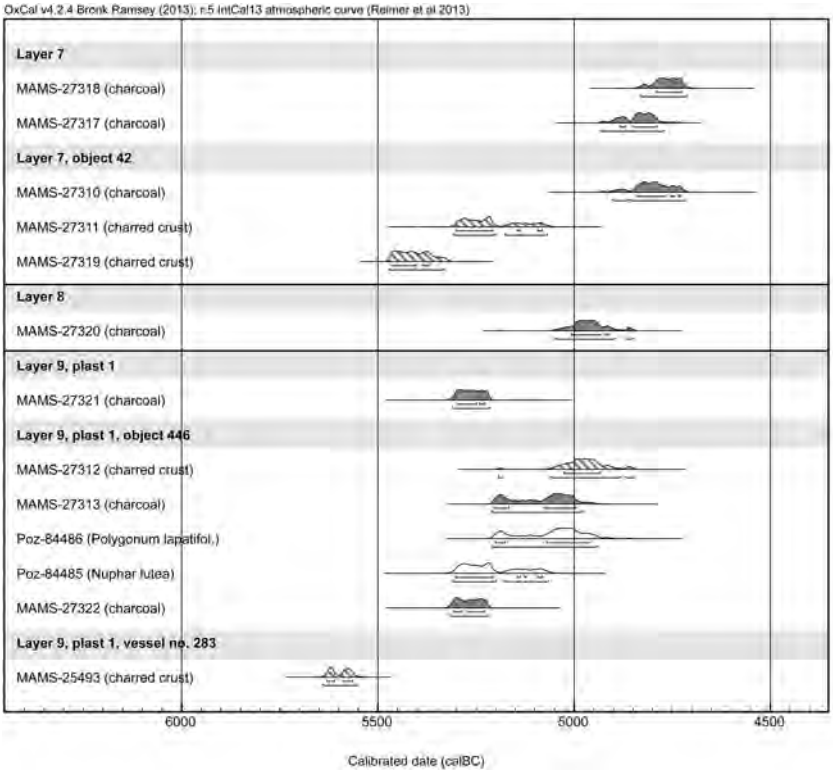

Fig. 1. Veksa 3. Calibrated AMS radiocarbon dates from Early Neolithic layer in test trench 1 of 2015. Dated materials: Grey — charcoal; hatched — charred crust adhering to pottery; white: charred plant seeds

Рис. 1. Векса 3. Калиброванные результаты AMS радиоуглеродного датирования образцов из ранненеолитического слоя, вскрытого в разведочной траншее 1 2015 г. Датированный материал: серая заливка — уголь; штрихованная — пригоревшие органические остатки на керамике; белая — обгоревшие растительные зерна

could be investigated. At the same time possible reservoir effects were able to be traced more comprehensively due to the dating of various materials from one and the same closed context (fig. 1). Of the new results from the upper part of the earliest cultural layer on site, layer 9, charcoal and plant seed samples date to the fourth quarter of the 6th millennium cal BC. A large temporal depth of more than 200 radiocarbon years is represented by the dates from context 446, an organic

lens within the layer. Substantially older is a charred crust date around 5600 cal BC from a pottery vessel that is typologically associated with the early phase of the Upper Volga culture. Here, a freshwater reservoir effect distorting the result might have to be considered. The charcoal date from layer 8 around 5000 cal BC is in good accordance with previous results from this layer and its associated pottery of the "second comb ware complex" (Nedomolkina, Piezonka, forthcoming). The three charcoal dates from layer 7 which is associated with comb-pitted ware of the so-called "northern types" range within the first quarter of the 5th millennium cal BC. One of these samples was adhering to the remains of a ceramic vessel (object 42) from which two samples of charred crust were also dated. These foodcrust dates are between ca. 300 and ca. 500 radiocarbon years older than the charcoal date, underlining the possibility of substantial, yet variable freshwater reservoir offsets in pottery foodcrusts at Veksa. Altogether, the new AMS dating results from various Early Neolithic layers at Veksa 3 elaborate the temporal scale of sedimentation and human activities at the river bank in this area. At the same time, they back up the previous assumption that there might be a substantial freshwater reservoir effect in dated samples that largely consist of aquatic resources, such as charred crusts on pottery (Piezonka et al., 2016).

A second test trench was opened on the river bank in the area of a concentration of over 1800 wooden piles and stakes, some of which had previously been dated to the Late Neolithic / Early Metal Age transition around and just after 3000 cal BC (Недомолкина и др., 2015b). From this trench, AMS dates were conducted on one sample from a wooden piles, two samples from two different fishtraps and four samples from natural wooden remains. The resulting sequence is in neat accordance with the stratigraphy, as it has not been distorted by aquatic reservoir effects due to the chosen sample material. The pile date fits with three of the four other existing dates on piles at Veksa, falling into the middle of the first half of the third millennium cal BC. One of the fish traps also dates to this time, while the other one which was located slightly further up in the sequence dates to just after the middle of the millennium. According to preliminary archaeobotanical and sedimentological results, the entire sequence of the pile field and fish traps is associated with a phase of stagnant to standing water at

this part of the river bank. Two dates of wooden remains fall between the two fishtrap values, while further wood dates attest to a Bronze Age date in the third quarter of the second millennium cal BC of the riverbank sediments in the upper part of the stratigraphic sequence, which again are associated with a flowing river environment. In a pilot study, the dendrochronological potential of the pile concentration was assessed. The results are very promising for further research, since of thirteen samples of pine piles, six have been felled in the same year, thus opening up the opportunity of identifying contemporary structures as well as building sequences. It is also hoped that in the future it might be possible to link the Veksa sequence to the Finnish pine curve, thus enabling absolute dating of dendrochronological samples.

Outlook

Recent research into the chronology of the multiperiod archaeological remains at Veksa 3 have resulted in a better understanding of the archaeological sequence and its interrelation with environmental developments. It was also possible to demonstrate that a substantial freshwater reservoir effect might be affecting samples with aquatic components. Altogether, Veksa has great potential for furthering research not only on the local culture-historical sequence but also for understanding the wider developments in the eastern European forest zone, both concerning the introduction and further development of early pottery (Mazurkevich, Dolbunova, 2015; Piezonka, 2015), and the phenomenon of built timber structures/pile constructions noticeable in the north-eastern European forest zone towards the end of the Stone Age.

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