

ARCHAEOMETRICAL RESEARCH OF LITHIC RAW MATERIALS FOR EARLY NEOLITHIC PREHISTORIC COMMUNITIES WITH THE HELP OF PROMPT GAMMA ACTIVATION ANALYSIS: THE AIMS OF PROJECT, CURRENT ACHIEVEMENTS AND FUTURE PERSPECTIVES

KORA-NEOLITIKUS KÖZÖSSÉGEK KŐESZKÖZEINEK ARCHEOMETRIAI VIZSGÁLATA PROMPT GAMMA AKTIVÁCIÓS ANALÍZISSEL - KÜLÖNÖS TEKINTETTEL A RADIOLARITOKRA ÉS OBSZIDIÁNOKRA: A PROGRAM CÉLKITŰZÉSEI, EREDMÉNYEI ÉS PERSPEKTÍVÁI

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Abstract

After two initial years of work on Hungarian-Croatian project "Archaeometrical research of lithic raw materials for early Neolithic prehistoric communities with the help of Prompt Gamma Activation Analysis, with special regard to radiolarites and obsidians", this paper brings part of its outcomes: current achievements and guidelines for future steps from Croatian perspective. The very first petrographical analyses of Neolithic obsidian and radiolarites excavated on Croatian soil were covered with this research. Also, a few accessible samples from Bosnia and Herzegovina were also processed for a first time. Authors suggest a potential obsidian data-base in which all (or part of) known information of analysed samples would be stored and accessible via Internet.

Kivonat

Két éves együttműködés alapján szeretnénk beszámolni a következőkben a "Kora-neolitikus közösségek kőeszközeinek archeometriai vizsgálata Prompt Gamma Aktivációs Analízissel - különös tekintettel a radiolaritokra és obszidiánokra" című és tartalmú horvát-magyar kétoldalú nemzetközi együttműködési program eredményeiről, és felvázolni a további együttműködési terveket a horvát fél szempontjából. Ebben a programban valósult meg először horvátországi régészeti lelőhelyekről származó obszidián és radiolarit eszközök vizsgálata; továbbá, néhány mintát volt alkalmunk megvizsgálni Bosznia-Hercegovina területéről is. A szerzők javasolják egy interneten keresztül elérhető obszidián adatbázis létrehozását is, ahol a vizsgált minták adatai hozzáférhetővé tehetők.

KEYWORDS: OBSIDIAN, RADIOLARITE, STONE ARTEFACTS

KULCSSZAVAK: OBSZIDIÁN, RADIOLARITE, KŐESZKÖZÖK

The Aims

The project Archaeometry research of lithic raw materials for early Neolithic prehistoric communities with the help of Prompt Gamma Activation Analysis, with special regard to radiolarites and obsidians has not been finished, although participants in the projects met this October in Budapest for the closing event. But it was not the time to make great and final conclusions - the project just came to the end of the initial phase. Why did we choose exactly this subject? The lithic implements gave the name to the longest period in human history i.e. prehistory - the term Neolithic, deriving from ancient Greek, as well as its counterparts in other languages, is determined by the fact that the stone was the most

important raw material for producing tools, weapons and other artifacts - at least the material that archaeology can prove. For a long time of prehistoric research such artifacts have mostly been studied by the means of their typological and stylistic features. Though we must say that even the 19th century archaeologists, with the help of the geologists, already tried to analyse the petrographic and mineralogical contents of the stone artifacts. The study of the raw material, that had been used by different prehistoric communities, is very important in tracing the movement of prehistoric goods and, consequently people, what is one of the key questions of the process of Neolithisation. So one of the main aims of the outlined project was to find out the possible sources of defined raw material. We chose radiolarites and obsidians because both of them are key-elements in the lithic

supply of the Carpathian Basin and they could be found in most Neolithic assemblages. Present-day Hungary and Croatia were parts of the same area, Carpathian or Pannonian basin and during the most part of prehistory they had similar situation, the same or very close related prehistoric communities settled both territories. We know that from various archaeological evidence, but we wanted to confirm those connections also in the sense of exchange not only of the goods but also of the raw material. That is best evident concerning the supply of obsidian - there are no geological resources of obsidian on the territory of present-day Croatia. And yet we have obsidian artifacts at many Neolithic sites in Croatia. If we want to trace the sources and the routes of its origin and distribution we had to look to Carpathian or to Mediterranean sources. Of course we already supposed that the most obsidian implements found in the context of Neolithic cultures, especially Sopot Culture, in the northern part of Croatia, should originate from Carpathian basin, i.e. northern Hungary, and that the artifacts along the Adriatic coast should most probably derive from Italian sources. Questionable was the area of Bosnia and Herzegovina which had always been the transitional zone between Pannonian and Mediterranean part of Croatia. The archaeological evidence already showed the cultural mixture of both influences, Adriatic and Pannonian. Once again, thanks to the results gained during this project, we confirmed that the area in question was the border zone in the sense of supply of obsidian. At the central Bosnian Neolithic sites we found obsidian deriving from both areas, Carpathian and Mediterranean, as will be discussed in more detail in following lines.

Since the beginning of the study of the lithic raw material the largest problem were the methods applied. Most of them are destructive - they damage or even destroy archaeological artifacts. Of course archaeologists and museums curators are not supposed to allow that. It is necessary to apply a non-destructive method, which Prompt Gamma Activation Analysis proved to be.

What did we achieve during the last two years? We collected both samples, archaeological and geological, we found out possible sources of radiolarites also in Croatia, we confirm import from the territory of Hungary to the territory of Northern Croatia and Central Bosnia, we confirm the import from the Italian sources to the Croatian Adriatic coast as well as to central Bosnia where we also defined the border zone. When concerning Croatia we finally started systematic raw material prospection and mapping of raw material resources. While looking for the possible sources of raw

material we found for the first time in Croatia traces of prehistoric mining activities. The main aim of the project has been fulfilled in the sense that we started creating the data basis of archaeological artifacts and geological samples of radiolarites and obsidian, originated from the areas of Hungary, Croatia and Bosnia and Herzegovina.

As said at the beginning, this is not the end of our work, this is only the initial phase in which we proved that our choice of the subject and the method applied was good and effective and that we should continue in the same way. How to go on and what would be the perspectives of our future work?

Perspective and achievements on obsidian samples

The perspective of the project we see in developing the data basis (which would include the results of the analyses, illustrations of the artifacts and samples, referent literature), enlarging it and make it available to all interested scientists. The fact is that 100% of available Croatian and Bosnian obsidian (archaeological) artifacts were enfolded within this project. One should keep in mind that there was no single analysis performed on such material from both countries. Shape of Croatia (horseshoe shape), division of its Neolithic into two main geographical groups (continental and coastal group) as well as some other features, gives an opportunity to "predict" the spread of luxurious and imported material like obsidian (Fig. 1). Since the two nearest neighbouring sources of obsidian lies north and south of Croatia, import of obsidian is divided in the same manner: imports to continental part originate from Carpathian source while obsidian finds from coastal sites belong to western Mediterranean source group.

After those "expected" results, a new question raised: where does the border between Carpathian and Mediterranean obsidian lie? Thanks to excellent collaboration with the archaeological institutions in Bosnia and Herzegovina and their scholars (namely Zilka Kujundžić-Vejzagić and Ljiljana Jevtić from the Prehistory Section of National Museum of Bosnia and Herzegovina in Sarajevo), we were able to collect all known Neolithic obsidian finds from old excavations in Obre I and Gornja Tuzla. During that collection process, a new excavation at Okolište (Central Bosnia) was performed by the German archaeological team. The excavations were conducted by Prof. Dr. Johannes Müller, Institut für Ur- und Frühgeschichte, Christian-Albrechts-Universität Kiel, Germany.



Fig. 1: Map of obsidian sources from which archaeological obsidians are found in Croatia and B&H. Red dot marks Central Bosnian sites (Okolište and Obre). (Map provided by Google Earth, 2009.)

1. ábra: A horvátországi és bosznia-hercegovinai régészeti obszidiánok és a nyersanyagforrások. A vörös kör a közép-boszniai lelőhelyeket jelzi (Okolište and Obre). (Google Earth térkép, 2009.)

The two sites situated in Central Bosnia (Obre and Okolište) show to be lying on the exact border zone between above mentioned obsidian sources (Fig. 1). It is important to emphasise that Obre contains the obsidians from Carpathian and W Mediterranean sources, following the same pattern visible on Neolithic pottery flow (mixture of two cultural complexes: Starčevo from north and Impresso from south).

Data base

"Side effect" that originated from this project made participants to consider making the web-based database where all results would be stored. Base with the data like finding place, context, stratigraphy, chemical composition given by PGAA of specific obsidian artifacts, would be very helpful for scholars dealing with the problems of Balkan and Central European Neolithic in general. Furthermore, such database can be used in future, to

construct much larger one, which would contain the data from all available European sites that enclose obsidian artifacts.

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