

February 4, 2024

Review of Greta Brancaleoni's doctoral dissertation entitled *Reconstructing depositional and postdepositional processes at Obishirian sites (Central Asia - Kyrgyzstan)*

Since the crystallisation of the geoarchaeological approach in the 1970s, a great deal has changed in both geological and archaeological research methodology. Changes have also occurred in the scope and purpose of joint research. Whereas only three decades ago, the participation of geologists was regarded as an important addition to the assessment of the environmental dynamics of the archaeological site deposition, today, the earth sciences specialists assume the role of moderators of environmental research *sensu lato*, not seldom discussing phenomena related to human adaptation and the development of cultural behaviour. An extensive research workshop allows them to do so. The result of such modern efforts is the dissertation of Ms Greta Brancaleoni, which was prepared under the supervision of Dr hab. Maciej Krajcarz.

Aim and subject of the dissertation

The aim of this dissertation is to reconstruct syn-depositional and post-depositional processes in archaeological sites belonging to the so-called Obishirian (Obishir-1, Obishir-5) within Kyrgyzstan. The Obishirian unit is dated to around 9,500-6,500 years BP and has recently been identified with the earliest stage of Neolithisation in this Central Asian region.

Understanding the site formation processes of Obishirian sites is key to constructing scientifically valid hypotheses, as with many other archaeological relics. The author has set herself the task of defining and separating the processes that form sites during human activity and those that occur after settlement has stopped. The latter can mask, reduce, or destroy earlier traces. Through elaborate methods, the author has proven the presence of traces of animal herds in the area of the sites, which significantly supports the earlier hypothesis of the relationship of the sites to pastoral practices. She has also shown the wide range of changes that affected the remains of both Obishirian and the younger and older relics of occupation of the analysed sites.

In my opinion, the author's aim has been achieved. The author has fully reconstructed the set of processes responsible for the formation of early Neolithic sites. The results of the research are original in nature. They are also of great importance for future research conducted in the

region. Taking into account the review of the existing literature on Central Asia, I consider the choice of the topic of the thesis to be very pertinent and extremely necessary. It is worth remembering that Central Asia has for many years been considered one of the most important sources of animal domestication and the distribution to other territories of a new mode of economy, as the author points out. Unfortunately, this opinion is not supported by much research, which was limited to palaeozoological analyses in the past. Modern geoarchaeology provides tools that make it possible to identify the presence of animals even when bones have been severely damaged by slope processes or chemical-physical weathering.

Content and structure of the dissertation

The dissertation in English is a compact study. The doctoral student has based the dissertation on three thematically consistent publications. They also represent an original solution to a scientific problem. Two papers have been published, while the third has been submitted for publication. All papers are related to journals in Part A of the list of journals of the Ministry of Science and Higher Education. The PhD student in all papers is the first author.

Here is the full bibliographic record:

1. Brancaleoni, G., Shnaider, S., Osipova, E., Danukalova, G., Kurbanov, R., Deput, E., Alisher kyzy, S., Abdykanova, A., Krajcarz, M. T. (2022). Depositional history of a talus cone in an arid intermontane basin in Central Asia: An interdisciplinary study at the Late Pleistocene–Late Holocene Obishir-I site, Kyrgyzstan. *Geoarchaeology*, 37, 350–73. <https://doi.org/10.1002/gea.21892>.
2. Brancaleoni, G., Kot, M., Shnaider, S., Mroczek, P., Kurbanov, R., Abdykanova, A., Alisher kyzy, S., Khudjanazarov, M., Pavlenok, K., Krajcarz, M. T. (2023). A closer look at clasts and groundmass: Micromorphological features in sediments with archaeological significance in Obishir and Katta Sai complexes (Central Asia), *Journal of Archaeological Science: Reports*, 51, 104118, <https://doi.org/10.1016/j.jasrep.2023.104118>.
3. Brancaleoni, G., Shnaider, S., Lempart-Drozd, G., Deput, E., Abdykanova, A., Krajcarz, M. T. Geoarchaeological approach for tackling the function and preservation state of the Obishir-5 site, the earliest Neolithic site in the Fergana Valley, submitted on 23rd October 2023 at *Journal of Archaeological and Anthropological Science*.

The thesis under evaluation runs to 311 pages. The dissertation consists of several parts, forming 7 chapters, a bibliography and 4 supplements, 3 of which contain the articles that constitute the basis of the dissertation. The opening pages i to xiv provide background information, including a list of figures and tables. These chapters contain the essential elements of the dissertation, starting with the Introduction, where the background is discussed, and the objectives and structure are characterised. The dissertation is thus complete, containing all the required parts.

Research methodology

The author used a wide range of methods, typical of geoarchaeological and bioarchaeological studies. The range of methods used was adapted to the nature of the colluvial

sediments. The author took into account the fact that the sites are located in Central Asia, where the sediments are subjected to specific transformations, including through bioturbation.

The set of methods fits all the major components, starting with field observation and stratigraphy documentation. The observations are documented with excellent figures, where photographs and explanatory drawings are combined. The sampling method is described in detail and adequately illustrated. Another method, micromorphology, played a key role in the analyses of all sediments. Among other things, it allowed detailed identification and classification of depositional and post-depositional processes. Micromorphological studies revealed the presence of dung material characteristic of the Early Neolithic livestock. The materials indicate that these were sheep and goats. The conclusions on the origin of the plant remains are interesting. It was concluded that there may have been intentional burning of plants and faeces together with bones.

Another method was the assessment of grain size, as detailed in the second article. To assess the origin and dynamics of the sediments, a dry sieving analysis was carried out in the fraction range from 2 mm to 50 mm. As a result, a fairly stable sedimentation process was shown at the studied sites. Some contribution of aeolian processes was also indicated.

Geochemical studies and analysis of the mineralogical composition of sediments to identify geogenic, anthropogenic, pedogenic or weathering levels and the succession of sedimentary events proved to be extremely important. Statistical analyses were carried out using correlation tests with R-Studio. So-called powder x-ray diffraction (PXRD) and Infra-Red spectroscopy (FTIR) were used. The results of palaeozoological analyses were used as an important proxy. ¹⁴C and OSL dating were also relevant. The author's idea of a stratigraphic accumulation rate to assess "sediment accumulation rates" was also introduced.

The language

The language of the dissertation is communicative. The work has been very carefully edited. The author brings out various terms by referring to the canon of literature. The author has avoided jargon despite dealing with complex geoarchaeological issues.

Evaluation of the content: strengths of the work

Greta Brancaleoni's work concerns sites located in a region that is very poorly recognised geologically. If research was undertaken, the focus was on processes and sediments that could be relevant to the reconstruction of global changes. Such a state of research could not have been an important foundation for a PhD student. In this situation, it should be considered a very important achievement to propose a multiproxy research model, which had to be initiated by defining the basic characteristics of the sediments, including the colluvial formations that dominate the area of Obishir sites 1 and 5. I believe that the proposed research method will play the role of a canon. Its most entire description can be seen in the third article.

Another significant achievement is the identification of various geological processes, processes linked to the presence of man or caused by his activity. The effects of individual phenomena are presented in great detail. The author has also drawn attention to issues that, despite the involvement of modern tools, are difficult to explain unambiguously, which I consider to be evidence of scientific maturity.

