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made), general aspects of their production technology as well as individual types of activities performed during their performance, remnants of the probably ritual-like treatments observed on their surfaces and, finally, the type of raw material processed with their use, and thus the interpretation of their original function. It will be discussed the usefulness of the findings obtained thanks to the physical-chemical methods aforementioned, for the verification and supplementation of the information acquired through traceological analysis. From the other hand, also the reliability of microscopic analysis in the context of knowledge acquired through the use of modern physical-chemical methods will be verified.

The studies are funded by the scientific projects from the National Science Center (NCN) in Cracow (Poland) no. 2016/23/B/HS3/00689.

c. TOWARDS A STANDARDIZATION OF METHODS IN TRACEOLOGY: SETTING UP THE BASIS

Author(s): Pedergnana, Antonella - Calandra, Ivan - Gneisinger, Walter - Marreiros, João (TraCEr, MONREPOS Archaeological Research Centre and Museum for Human Behavioural Evolution, Neuwied)

Presentation Format: Poster

Understanding how artifacts were used in the past by humans is critical in the study of the evolution of human behavior. Although use-wear studies have shown promising results, a lot of criticism has been raised regarding standardization and reproducibility of methods.

Here we focus on three aspects of data acquisition and analysis that we believe represent fundamental steps toward standardized use-wear studies:

(1) Comparing surface topography before and after use: experimental use-wear studies classically focus on the wear produced during the experiments. However, tool production processes result in a unique topography on the created surfaces of the tool. This unused, post-production topography will, in turn, influence the subsequent development of use-wear. A complicating issue is that even two surfaces from the same sample will have different unused topographies. Here we present a simple protocol to precisely relocate a surface before, during and after an experiment, as well as for the re-analysis of the sample with different microscopes/methods.

(2) Quantifying use-wear: qualitative data are difficult to compare between studies, so we promote the use of a non-contact surface measuring microscope (confocal microscopy) to scan the surface of a sample in 3D. These 3D models can then be automatically analyzed to produce quantitative data that are statistically testable.

(3) Reporting of settings: the importance of equipment and analysis settings is often underestimated. Different pieces of equipment, objectives, light and analysis settings may all yield different results, both qualitatively and quantitatively. Here we list and discuss some of the relevant hardware and software settings that should be reported.

Ultimately, standardization will allow the sharing of data and the comparison, reproduction and replication of use-wear studies, lending more weight to our archeological interpretations.

d. HAMMER OR PESTLE? THE CONTEXT AND USE-WEAR ANALYSIS OF AN ANTLER TOOL FROM KOSTENKI 14, LAYER II

Author(s): Stepanova, Kseniya - Sinityn, Andrei (Institute for the History of Material Culture, Russian Academy of Sciences)

Presentation Format: Oral

Layer II of the Upper Palaeolithic site of Kostenki 14 (Markina Gora) (Voronezh Oblast) has yielded an assemblage attributable to the Gorodtsovian culture – an archaeological culture with without analogy in Central and Western Europe. Radiocarbon dates of $28,580 \pm 420$ BP (OxA-4115) and $29,240 \pm 330/320$ BP (GrA-13312) indicate an age for the layer of 33-34,000 cal BP. The layer's lithic assemblage is characterized by "archaic" components (side-scrapers, points similar to Mousterian types) with the application of developed techniques to work bone, antler and ivory for tools, decorated items and personal ornaments. During the 2014 field season a concentration of non-lithic finds was identified in direct superposition: a piece of pure red ochre on a horse mandible, in association with an antler percussor. The percussor was made from the basal part of a reindeer antler. It possesses two zones of use-wear: on the basal part the rough surface forms a bevel, and on the lateral surface impact marks form a slight rounded pit. The working surface on the basal part was intensively coloured with ochre. Given its archaeological context, this artefact is interpreted as a pestle used for pounding pigment. At the same time, traces of use (impact-marks, striations) and their location are consistent with its use as a soft hammer. In this presentation we discuss use-wear analyses of the tool and the problem of its functional interpretation. Arguments in favour of both hammer and pestle are forwarded and discussed, as is the possibility of its multifunctional use.

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