Functional Studies at Liège University:

TraceoLab

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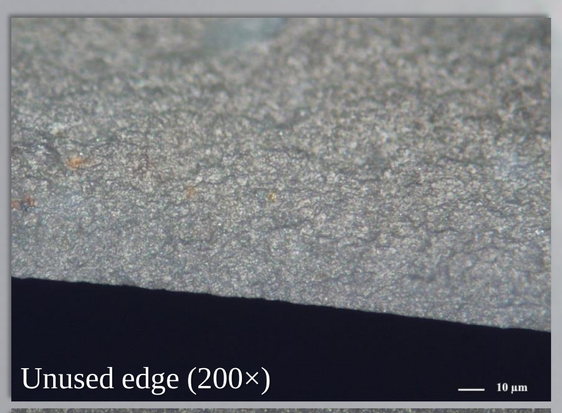
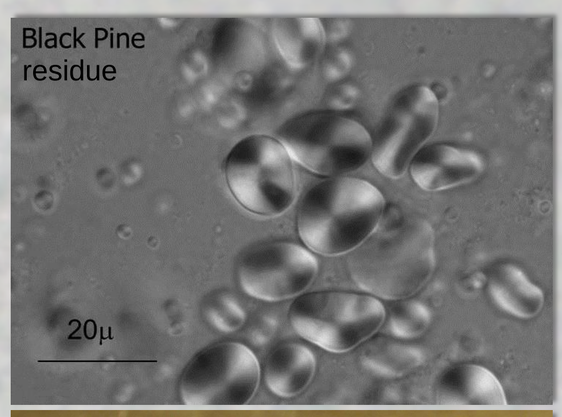
A new laboratory for lithic functional analysis has been installed at the *Service de Préhistoire* of the University of Liège. The goal is to integrate different methodological approaches such as microwear and residue analysis in order to improve our understanding of prehistoric human behaviour. Most attention is focussed on the Palaeolithic period, even though younger assemblages may be integrated occasionally when judged relevant.



How does it work?

The friction between the stone tool and an organic material, for instance during tool use, results in wear traces on the contact edges (polish, scarring, rounding, striations). These traces are diagnostic of the material worked and the motion that was exerted and they can be identified through observations under a microscope. A combined use of a stereoscopic microscope (magnifications up to 80×) and a metallurgical reflected light microscope (magnifications up to 500×) has proven to be a reliable approach for the identification of the traces. The traces on the archaeological tools are interpreted through a comparison with an experimental reference collection.

Due to the friction between the stone tool and an organic material, also residues may adhere to the stone tool surface. These residues may consist of fibres, collagen, fats, starch grains, phytoliths, adhesives, etc. Residues can be observed with a metallurgical reflected light microscope (polarisation, DIC, magnifications up to 1000×) while still on the stone tool, or they can be extracted onto slides and observed under transmitted light. Residues are identified through a comparison with a reference collection that consists of experimentally used tools and modern-day reference samples.



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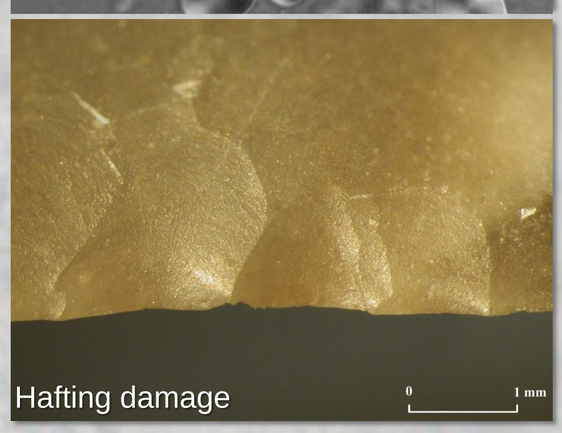

Stone tool life cycles

Wear traces and residues form at different phases throughout a stone tool's life cycle and a modern-day functional analysis takes into account all this evidence. During knapping or tool shaping, traces result from the friction between the hammer and the stone tool. During use, traces form on the active tool part from the direct contact with the material worked and on the non-active tool part from the contact between the stone tool and the hand or the hafting arrangement. The characteristics of the hafting traces depend on the materials (wood, bone, antler, etc.) and the kinds of fixation mechanisms (bindings, glues) used for attaching the stone tool to the handle. Also traces from resharpening may be observable. Unfortunately, stone tools are not always preserved in pristine conditions and after discard, functional traces on stone tools may be affected to varying extent by trampling or post-depositional processes.

Importance of experiments

The reliability of a functional analysis depends on the extent and completeness of the experimental reference collection. This collection needs to be continuously expanded in order to understand the variability in the archaeological record. This requires large-scale systematic work as well as specific experimental programs that address particular research questions. A large-scale systematic experimental program is currently being performed by Christian Lepers. Aside from that work, all experimental work is carried out in collaboration with CETREP (*Centre d'Étude des Techniques et de Recherche Expérimentale en Préhistoire, Chercheurs de la Wallonie*; Préhistosite de Ramioul).

From traces to technologies and human behaviour

A functional analysis allows to gain insight into the organic component of an archaeological site that is rarely preserved. Through the identification of production, use and hafting modes it provides a more dynamic view on an assemblage and it contributes to an improved understanding of stone tool morphologies and assemblage variability. Functional data also permit an identification of site function and an examination of intra- and inter-site patterning when combined with spatial data. It can be concluded that a functional approach produces unique data that significantly improve our understanding of prehistoric technologies, settlement organisation and past human behaviour.

Current research themes

Within the framework of an ERC-funded research project on the evolution of stone tool hafting in the Palaeolithic, TraceoLab now hosts a research team that is working on different complementary research topics under the supervision of Veerle Rots:

- variability of use and hafting modes in the Upper Palaeolithic (N. Taipale, PhD student)
- tool use and hafting in the Aterian complex in the Middle Palaeolithic of North Africa (S. Tomasso, PhD student, KAAK (Bonn))
- changes in hunting technologies throughout the Palaeolithic period (J. Coppe, PhD student)
- methodological development of residue analysis for an improved understanding of Palaeolithic stone tool hafting and use (D. Cnuts, PhD student)

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