A multi-methodological characterisation of flint: a case study from NW Belgium

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Abstract

In most regions of Europe, flint was by far the most important raw material for the production of stone tools during the Stone Age. The characteristics of flint material used for stone tool production in NW Belgium are investigated in this study. Due to the its formation process, flint is defined by a wide variety of internal structures, chemical variations and impurities. Moreover, flint weathering and the resulting alterations make the study of this material even more complex. Flint weathering is often expressed as patination, which is linked to the geological and archaeological context, and mostly present on Palaeolithic artefacts. Furthermore, burned artefacts appear throughout the entire Stone Age as a result of intentional (heat-treatment) or unintentional heating (forest or camp fires). The preservation of flint artefacts is influenced by these weathering processes, which are important aspects to consider in use-wear analysis as use-wear traces can be partially or completely obliterated. For this reason, altered artefacts are often neglected during analysis and may bias our understanding of the use of stone tools by prehistoric man. Therefore, it is important to understand how the flint characteristics influence weathering, and what the impact is of weathering on the preservation of use-wear traces. The first goal of this study is investigating the characteristics of flint material using a combination of traditional techniques such as optical microscopy, X-ray fluorescence (XRF) and scanning electron microscopy (SEM). Additionally, the possibilities of high-resolution X-ray computed tomography (micro-CT), providing 3D information of internal structures of flint, are explored because of its non-destructive nature and its potential for future time-lapse weathering experiments. The combination of above mentioned techniques allows us to work out a characterization protocol at macro-and microscopic scale, combining mineralogical, chemical and structural information. This protocol adds a new perspective to the worldwide ongoing research on flint characterisation and its archaeological significance. The selection of the raw materials is based on lithic finds excavated at various prehistoric sites along the Scheldt river, assumed to be made of raw material found in these areas. Therefore, the raw materials selected for this study are all located in the western part of Belgium (late Cretaceous outcrops near Mons, Lille and Tournai) and close to the border with the Netherlands (Western Scheldt, Vlissingen).

Keywords: flint, characterization, weathering, micro CT, optical microscopy, geochemistry

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