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# Between Palaeolithic cave art and modern graffiti – the Grottes d’Agneux in Rully (Saône-et-Loire, France)

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## Résumé

The discrimination between different engraved marks made with different tools is a relevant research topic in parietal art, both in Palaeolithic and post-Palaeolithic assemblages. In the caves of Agneux I and II (Rully, Saône-et-Loire, France) we have recorded thousands of engravings

done with a large variety of tools. Some of the panels in these caves are real palimpsests that include graffiti (carved and painted) of words, names and dates, ranging from 16th century to 21st century, but we thought that some lines could be significantly older, even of Palaeolithic age. There is significant evidence supporting this possibility, including the extensive Upper Palaeolithic occupation of the region, and the radiocarbon age of some charcoal pieces retrieved from a sediment layer hanging over the nowadays entrance to the cave, indicating the maximum level of filling of the cave.

A specific methodology was applied to discriminate between the graffiti lines of historical age from those that could be made during Prehistory. Firstly, we carried out a thorough survey of the caves, mainly of cave I because of its larger number of engravings. Then several areas of interest were selected for an in-depth recording using close range photogrammetry. The panels were lighted with raking flash lights in order to enhance the visibility of the engraved lines. Recording was carried out using a Canon EOS 7D camera with different lenses, equivalent to a 35 mm, and to a 130 mm macro lens. Every set of pictures was processed in ultra-high resolution in PhotoScan Pro, including a professional color card for colorimetric rendering.

Orthophotos and digital elevation models (DEM) were generated from the 3D models. The orthophotos were the base for sketching the graffiti, supported by the application of virtual lighting to 3D models in Meshlab. This way, we tried to discard the lines that were obviously made in historical moments. The DEMs were used for extracting the cross-sections of the incised lines in order to look for evidence of the tools, allowing us to differentiate among broad

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carved lines, the incisions produced with burned wood or metallic tools and the incised lines compatible with the use of a flint burin.

The use of this methodology demonstrates that the utility of cutting-edge technologies in rock art is an archaeological tool for research that goes beyond mere recording.

**Mots-Clés:** 3D modelling, Palaeolithic art, photogrammetry, Burgundy, surveying, DEM, tool analyses