LIDAR and geophysics, how to try to document a flint mine without digging, the example of Malaucène (Vaucluse, France).

Pierre-Arnaud De Labriffe*[1,2], Pierre Andre*[†] , Adrien Reggio*[‡3], Vivien Mathe*[§4,5], and Adrien Camus*[¶6]

[1]Trajectoires - UMR 8215 – Université Panthéon-Sorbonne, Centre National de la Recherche Scientifique : UMR8215, SRA Occitanie – UMR 8215 Trajectoires MAE 21 allée de lÚniversité 92023 Nanterre cedex, France

[2]SRA Occitanie – SRA Occitanie – France

[3]AMU - LAMPEA – Aix-Marseille Université - AMU, UMR 7269 LAMPEA – France

[4]UNIVERSITE DE LA ROCHELLE – Université de La Rochelle, LIENSS UMR7266 – France

[5]UNIVERSITE DE LA ROCHELLE – Université de La Rochelle, UMR LienS - University of La Rochelle, France – France

[6]UNIVERSITE DE LA ROCHELLE (LIENSs UMR7266) – Université de La Rochelle, LIENSS UMR7266 – France

Résumé

he neolithic flint mine and quarry of Malaucène is one of the largest known in Europe. Flint extraction witnesses are identified on an area which exceeds 250 hectares. The extraction zones are distributed along several coombs that are nearly 2km long. The height of the slopes can approach 50m high. These valleys are narrow at their base and 200 m to 300 m wide at summit. Today vegetation is often made up of scrubland, hardly penetrable. Because of these topographic specifities and poor soil quality, these lands have never really been cultivated. They have almost remained in the state in which the neolithic people have abandoned them.
The intense activity of the miners has left enormous amounts of material related to mining. These wastes, consisting of limestone blocks and flint (nodules, fragments, chips or flakes), almost completely cover the ground. Nevertheless, they did not completely erase the underlying relief. In many areas the stigmata of flint recovery can still be discerned. They are in the form of large depressions that probably correspond to vestiges of large pits or wells. On the other hand, the walls of the coombs are sometimes totally hidden by the debris. In some cases these heaps are more than 30m high and 200m long at their base. We then have no idea of the general topography of the coombs walls.

Confronted with such large and extensive vestiges we wondered how to document them

*Intervenant

[†]Auteur correspondant: pierre.andre5@bbox.fr

[‡]Auteur correspondant: adrien.reggio@gmail.com

[§]Auteur correspondant: vivien.mathe@univ-lr.fr

[¶]Auteur correspondant: adrien.camus@univ-lr.fr

as a whole but also with accuracy. First and foremost, it was a question of being able to precisely point out the remains and give an account of their diversity and their complexity. A classic topographic survey would have been possible but almost unimaginable given the size of the area to be covered and its rugged relief. We opted for a Lidar survey. Despite the existence of areas with a fairly dense scrubland type vegetation, results are very convincing.

Once the current surface mapped by Lidar, we wondered how it would be possible to determine the thickness of the waste covering the substrate and whether it would be possible to find the traces of the walls of wells, pits or flanks of the coombs in order to find back the original reliefs and trying to precise the methods and techniques of extraction. To do this, we initiated a dialogue that led to a collaboration with the geophysics team at the University of La Rochelle and the Agphy Valor structure. In the course of the year 2017 we carried out a campaign of measures to see if these methods could be successful. Despite complications related to the configuration of places and difficulties of bringing equipment we were able to perform half a dozen test areas.

We will present here the results of both Lidar and geophysics. The combination of these two methods makes it possible to propose a new vision of the flint extraction methods on the Malaucene flint mine and quarry.

Mots-Clés: flint mine and quarry, lidar, geophysics