



Integrated geophysical and LIDAR surveys at the archaeological site of Ancient Epomanduodurum, Mandeure-Mathay (Doubs, Eastern France).

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For several years, some integrated geophysical studies were carried out at Mandeure-Mathay (Franche-Comté Region, Eastern France) for the archaeological evaluation of ancient Epomanduodurum. It's a site of a major scientific interest for understanding the territorial structure of earliest agglomerations in the Eastern Gaul at the end of the Iron Age and during the Roman period. As regards its size, urban equipment, monuments and function, the ancient town is considered as the second behind the civitas capital of Sequani, Besançon-Vesontio. It is located in the Doubs valley, where the plain of Alsace opens into the marches of Burgundy, in a traffic zone between the Vosges and the Jura. This location allows transit between the Rhône valley and the Rhein plain, through Saône and Doubs valleys. This geographical situation was a significant factor in the creation of the late Iron Age settlement, later to turn into a major Gallo-roman town. The whole site includes urban centre and two artisan suburbs. The buried ruins are extended moreover 500 hectares outside and inside a meander of the river.

The first "well-organized" research done on the site goes back as far as the end of the 18th Century. However, it is only round the beginning of the 19th century that major constructions such as the theatre (1820) and the sanctuary (1880) were uncovered. The status and the influence of Latenian sanctuary, located in the centre part of a great monumental complex of Early Augustan period, played probably an important role in the emergence of this foreground agglomeration.

From the beginning of the survey, in 2001, high resolution and no invasive geophysical methods have been performed on large scale both on the terrace and in the floodplain. Automatic Resistivity Profiling (ARP) and magnetic mapping were taken in grids covering respective areas of 60 and 40 hectares. Ground penetrating radar was occasionally used to confirm the detection of specific anthropogenic anomalies.

Numerous relics of public buildings as varied as temples, castrum, thermae, artisan and residential quarters or local system of roads were revealed by geophysical prospecting, enhancing largely the spatial pattern of buried relics of this site. Detailed information about use and chronology of some monumental structures were obtained by restricted excavations. Also, field walking, aerial photography, Digital Elevation Model have been combined with geophysical data using Geographic Information Systems. It allows to produce a general plan of the Gallo roman structures and to reconstruct settlement evolution.

For the study of the surrounding country of ancient Epomanduodurum, we will use the light detection and ranging technology (LIDAR) on a selected area survey of 81 km². This method is well adapted for the detection and location of cultural resources (ancient fields, buried structures, graves) in forested environment which in our case represents 45% of the surface coverage. For some restricted areas, a combination and a comparison between Lidar, geophysical prospecting and field walking will be performed in order to achieve the best possible interpretation of the archaeological features.