

Investigation of historic mining activity in the region of Sainte Croix (VD) using electromagnetic geophysics

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Context

The region of Sainte Croix (VD) has a rich history of iron mining activity dating as far back as early Roman times. Recent archaeological evidence suggests that Romans may have arrived in this region significantly earlier and in greater numbers than previously believed, possibly because of the abundance of iron. Today, the vast majority of hand-excavated Roman mining operations are covered by surface sediments and no longer visible. Determining their number and location represents an important goal towards better understanding the history of the region. Further, the unknown mines are a significant risk to farmers and the general population; a number have recently collapsed leaving dangerous voids many meters deep. Geologically speaking, the iron that was mined in this region comes from a relatively thin unit of Cretaceous ferruginous oolite that occurs between two major geological units of contrasting electrical resistivity. Detailed geophysical mapping of the surface contact between these units will provide important information on where there is a high probability of finding the ancient mines.

Objectives and Methods

In collaboration with an archaeologist from Sainte Croix and a local geophysical survey company, we will use electromagnetic (EM) geophysical surveying to map the geological contact between the units sandwiching the iron-bearing oolite at the surface over a large (kilometer-scale) region. Preliminary work that we have conducted near the village of Auberson (VD) suggests that the contact is well identified using EM methods. Further, the survey region is topographically approximately flat and very open, meaning that it is ideal for large-scale geophysical mapping. Once the geological contact has been mapped, we will proceed to compare its location with recent high-resolution LiDAR surveys to identify zones where mines are highly probable. Further refinement with local geophysical surveying and archaeological studies may be conducted.



Choice of orientation :

1) Sedimentary, Environmental and Reservoir Geology / 2) Geochemistry, Alpine tectonics, Ore Deposits / 3) Geological Risks