A RAPID WAVELET-BASED INTERPRETATION TECHNIQUE APPLIED TO MAGNETIC AND VLF DATA FROM AN ANTIQUE MINE

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Magnetic and VLF data have been acquired at an Antique iron mine near Saales (50 km W of Strasbourg, France). The site is nearby a Roman road and contains sludge and elements of smelter and burnt sandstones. Some elements are visible, others are suggested by geophysical data. Some of these structures may exhibit high resistivity (up to 200 Ω/m) or high susceptibility constrasts (up to 0.45 SI). We present our first results of geometrical characterization to eventually describe possible smelters.

We have applied a recently developed continuous wavelet technique to address the inverse problem of potential fields. In this technique, we consider the wavelet coefficients, which are the derived fields or analytic signals continued upward at various scales. They are also the correlation coefficients with a series of Green's functions of the Poisson equation that links the sources to the observed fields. The scale is akin to altitude (for the upward continuation) and it corresponds to the depth of homogeneous sources for the Green's functions. Thus the shape of wavelet coefficients is associated to parameters of the source: i.e. depth, borders, thickness, dip and azimuth. The technique has the advantage of noise removal and enhancement of causative source boundaries.