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Field validation of mineral prospectivity approaches, a first test of the CBA method

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Numerous methods of mineral prospectivity mapping have been developed during the last decades and it is often difficult to evaluate their reliability and adequacy. Some objective a posteriori approaches allow calculating their performance such as, for instance, AUC values on ROC curves. However, we believe that field control is a necessary step, especially in the context of mineral targeting in greenfield exploration.

Mineral prospectivity mapping generally relies on unequivocal associations between discrete data (e.g., known deposits) and polygons (e.g., lithology, geophysics, geochemistry, etc.). Consequently, the quality of results obtained from 'classical' methods (e.g., Weight of Evidence, Fuzzy Logic, Logistic Regression, Neural Network, etc.) strongly depends on the accuracy of input data (location of points and contours of polygons) which, in many cases, may be questionable. To address this issue of geographic inaccuracy of map elements, BRGM has developed the CBA (Cell Based Association) method. Its base principle is not to rank polygons in which known deposits are located, but to identify favorable association neighboring these deposits (i.e. in cells of a regular grid containing them).

In order to assess the adequacy of CBA for mineral targeting in early exploration phases, we have done a first field validation campaign for Sb in the Vendée region (western France). 107 soil samples have been collected (auger drill) in both favorable and unfavorable cells (according to CBA results) and across know Sb-bearing veins. They have been analyzed at ultra-trace level using ICP-MS/ICP-AES (detection range of 0.05 to 10 000 ppm for Sb). In this contribution, we present an overview of the CBA method, its resulting prospectivity map for Sb in Vendée, the sampling and analyzing procedure, the preliminary results we have obtained and the first conclusion they allow.