The use of Field Portable X-ray Fluorescence Spectrometry (FPXRF) for the geochemical spatial analyses of waste-rock dumps

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With this work, we used the X-MET7500 (Oxford Instruments) FPXRF for the geochemical spatial analyses of sulphide-bearing waste-rocks piled up on a small sized mining dump. The main goal of the research was to verify the applicability of this rapid and economic technology for the *in situ* characterization of very heterogeneous sediments containing high concentrations of ecotoxic elements. We performed an initial sampling and analysis phase, for the preliminary screening and for calibration purpose, by determining (either by FPXRF and ICP) the relative concentrations for a selected suite of metals (Cr, Ni, Cu, Zn, Pb, As, Cd) at all points of a 15 x 15 m grid. On the basis of the preliminary screening results Cr, Ni, Cu, and Zn were selected as representative markers of the waste-rock contamination and a new analytical plan, based exclusively on *in situ* FPXRF analyses, were performed by reducing the sampling grid to 5 x 5 m. Thanks to the possibility to perform a large number of *in situ* analyses, in a cost efficient and timely manner, we obtained very high resolution maps of metal distributions which resulted much more statistically significant than those obtained using a traditional approach.

Keywords FPXRF,Waste-rock dump

Geostatistical estimation of the global resources of a karst iron deposit: Case of Anini iron deposit (north eastern Algerian)

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Abstract: Jebel Anini iron deposit is located in the north eastern Algeria. It presents vein karst morphology. The ore bodies are the result of filling infiltration in a series of parallel fractures NNW-SSE direction (N330 °). The iron mineralization consists mainly of hematite and goethite mass associated with ferruginous clay effusions. This deposit was explored using 68 core holes. The core samples were analyzed on Fe2O3.
Variography of Fe2O3 and accumulation showed anisotropy whose major axis has a N330 ° orientation. This direction corresponds to the direction of the faults sills. The experimental variogram in the direction of the minor axis of the ellipse anisotropy - N60 ° has a hole effect of a periodicity of 200m on average. Directional experimental variograms were fitted with spherical model with anisotropy coefficient of 0.71. Variography confirms fault system-karsts direction N330 ° separated by an average of 200m. This result clarifies the mesh exploration in this type of deposit.
Iron ore resources 100x100m blocks were estimated by ordinary kriging. However, this method does not take account of the periodic discontinuity of mineralization. To remedy this, it is necessary to consider the mineralization coefficient. The optimization of the mining operation of this type of deposit would pass through the object simulation.

Keywords Geostatistical estimation,Hole effect,Iron deposit,Mineralization coefficient