Estimation of the gold concentration using MARS model in shear zone mineralization-SW of Saqquez, Iran

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Multivariate Adaptive Regression Spline Modeling

In this article, Multivariate Adaptive Regression Spline (MARS) was used to estimate Au values based on the paragenisis elements. Later, the estimated and measured values were compared to evaluate the estimation error. In addition, the paragensis elements that were determined by MARS were confirmed by the traditional methods.

MARS is a nonparametric modeling technique which is suitable to estimate the underlying nonlinear patterns hidden in complex high dimensional data set [1]. A general form of MARS model can be represented as follows:

$$\hat{y}=C_0 + \sum C_i B_i(X)$$

where B_i are spline basis functions that may be a single or a product of two or more piecewise linear functions of the form

$$max\{0, x - t\} \text{ or } max\{0, t - x\}$$

where x is an independent and constant t is called the *knot* [2].

The results for a case study of shear zone gold mineralization [3] show that MARS has been successfully estimate the amounts of Au (Fig 1).

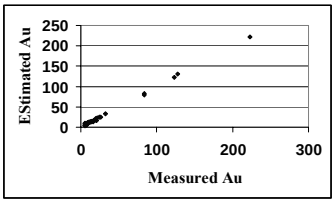

Figure1: A comparsion of measured and estimated values.

Conclusion

MARS consider the interactions between the sub-regions of independent. In addition, it can evaluate the importance of each independent used to construct the basis functions.

[1] Friedman (1991) *Ann. Stat*. **19**, 1-141. [2] Hastie & Tibshirani (2001) *The Elements of Statistical Learning*, p.533. [3] Haydari (2004) MSc thesis, p.150. [4] Seyedrahimi-Nayragh (2007) MSc thesis, p.148.

Toward a new concept for the classification of rocks of the Eastern Desert, Egypt: Constraints

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The change from compressional to extensional tectonic regimes at the end of the Pan-African orogeny is accompanied by a transition from syn-collisional calc alkaline plutons to post-orogenic alkaline granites.It is indicated that a depleted upper mantle origin of calc alkaline magma, was gradually changed into alkaline type throughout dehydration and contamination from the subducted oceanic crust. The original upper mantle is changed by progressive distentional movement during collision creating successive intrusions of granitic rocks that exhibiting variant thermobarometric and depth conditions. Egyptian granites of the Central Eastern Desert formulate a perfect example showing a successive array starting from relatively deep calc alkaline granite (Katazonal granite) formed at a depth of 9.5 km. to proper alkaline granite at relatively shallower (Telezonal granite) depth of 1.2–1.5 km. Between the two extremes, transitional granitic rocks were Emplaced at different levels of depth (Mesozonal and Epizonal types).This work introduces Incompatible ratio diagram (IRD), which yields a valuable discrimination between the different types of granitic rocks. IRD diagram has been tested to confirm other classifications of granitic rocks and to provide a realistic schematic classification of granitic rocks as well. It is recommended to use Katazonal, Mesozonal, Epizonal and Telezonal granites as significant terms for granitic classification of the Eastern Desert.