Modeling the Anisotropic Ellipsoid by Applying Analytic and Graphic Methods for the Narigan Uranium Mineral Deposit

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Abstract:

For geostatistical estimations and simulations, many parameters are required, in order to have acceptable estimation and simulation results and provide optimized structure of assay distribution within the deposit. One of these very significant parameters is the anisotropy ellipsoid of assays. The anisotropy ellipsoid is a parameter which illustrates assay variations in different directions within the deposit. Actually by modeling this ellipsoid, assay continuity within the deposit could be understood for various defined directions, illustrating orientation for the maximum and minimum assay continuity in the deposit. In geostatistical estimations and simulations, orientations with maximum assay continuity, have a larger share of points applied for estimation of a block. This article describes the study of Narigan uranium mineral deposit, located in the Central Iran region, by application of the analytic and graphic methods for modeling the anisotropy ellipsoid of uranium assay. For the analytic method, the major components technique has been applied by preparing a covariance matrix of uranium assay, which rendered the parameters of the ellipsoid. For the second method, by application of graphic techniques and assistance of primary and secondary variogram surfaces, the anisotropy ellipsoid has been modeled. Raw data applied in both methods are natural gamma logging data from drill-holes of the general exploration phase. Finally the results of both methods have been compared, showing that they are similar, which proves that both methods are stable.

Key words: anisotropy ellipsoid, curve fitting, geostatistics, estimation