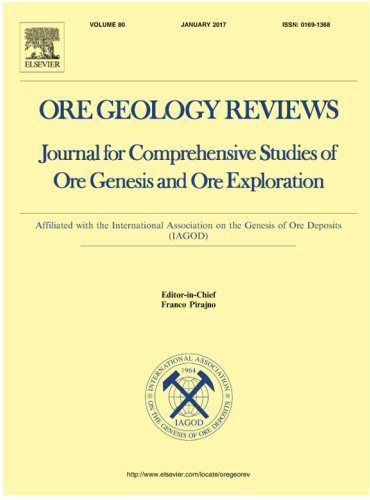

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PII: S0169-1368(18)30053-2
DOI: https://doi.org/10.1016/j.oregeorev.2018.06.019
Reference: OREGEO 2613

To appear in: *Ore Geology Reviews*

Received Date: 21 January 2018
Accepted Date: 27 June 2018

Please cite this article as: D.A. Singer, Comparison of expert estimates of number of undiscovered mineral deposits with mineral deposit densities, *Ore Geology Reviews* (2018), doi: https://doi.org/10.1016/j.oregeorev.2018.06.019

Comparison of expert estimates of number of undiscovered mineral deposits with mineral deposit densities

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Abstract

The difficult and critical problem of estimating numbers of undiscovered mineral deposits has long been addressed by experts making subjective judgments. Few tests of the quality of such estimates have been made due to long lag times before exploration results are available. Estimates made by expert teams in 100 published permissive tracts are compared to those made by mineral deposit density equations. The density equations, developed from 109 well-explored control tracts containing 10 different deposit types, provide a robust basis for comparison to ground truth.

Approximately 90 percent of the experts' estimates of median number of deposits are within 1 time the density equation estimate. Where experts' estimates were lower than the density estimates, the experts probably had relevant information about negative exploration in the tract. In tracts where experts' median estimates were remarkably higher than the density estimates, there were many known deposits. Two exceptionally high estimates by experts appear to be due to unawareness of how unusual the estimates were. In one tract, an exceptionally high estimate by experts may be due to not properly using an aggregation of adjacent deposits rule for the grade and tonnage model because the number of known deposits was improbably high also. Some of 100 expert estimates of expected number of undiscovered deposits are close to the median estimate, a result not consistent with known densities of deposits. The density equations can be improved by adding new deposit types in proper control tracts. Having analysts familiar with resource statistics as part of the assessment team and using the density equations in all assessments